StairMaster®

ClubTrack® 2100 Series Treadmill

Service Manual

NAUTILUS®

PN 000-6583 Rev AA (2/20/2006)

Important—Please Read

This manual is intended for authorized Nautilus or Nautilus certified service personnel and not for the consumer. There are no user serviceable parts. Servicing of the StairMaster® ClubTrack® 2100 by other than authorized Nautilus or Nautilus certified service personnel may result in voiding of the warranty.

If you are a consumer and require technical support to resolve a problem with your StairMaster® ClubTrack® 2100, please call Nautilus Customer Service at 800-864-1270 (USA) or +41-26-460-77-77 (outside USA).

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Part 1

Maintenance

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Viewing Maintenance Information

The total time and distance the treadmill has been in use can be viewed using the Machine Status console codes. This information can help you schedule treadmill maintenance and check treadmill usage.
To view the treadmill's run-time information:

1 Press CLEAR, 4, 0, and ENTER. The controller will display the machine run time in hours since last cleared.

2 Press CLEAR to exit.

To view the total distance the treadmill has been used:

1 Press CLEAR, 4, 2, and ENTER. The controller will display the total distance the machine has gone since last cleared.

2 Press CLEAR to exit.

Routine Maintenance Schedules

Performing routine maintenance will help prevent unnecessary wear to the treadmill and/or injury to the user. The maintenance schedules are meant only to serve as a guide. Depending on where and how the treadmill is being used, more frequent routine maintenance may be required.

Daily

- Inspect the power cord and walking belt for wear.
- Check the position of the walking belt. Verify it is not rubbing against the frame. The belt should be evenly spaced on the deck within 0.25 inches. Adjust the belt if necessary.
- Check the optional side handrails to ensure they are fastened securely.
- Remove potential hazards from the treadmill area.

Cleaning

Keeping the StairMaster® 2100 LC/LE treadmill clean on a regular basis will help to improve operation and increase the lifespan of the components.

Daily

- Keep the treadmill and controller free of dust and debris. Use a damp sponge to wipe the exteriors and walking belt; do not soak surfaces. Dry all surfaces thoroughly.

Weekly

- Elevate the treadmill to maximum incline and vacuum the floor under it to prevent excess dust and dirt from interfering with operation.
- If the magnetic key is being used, check it for rust. If you detect rust, replace the magnet. Rust on the magnetic key will cause power-up problems.

Treadmill Interior

Depending upon the treadmill environment, dust and or lint can accumulate under the hood. Clean the interior of the treadmill following the procedure below:

1 Turn the treadmill circuit breaker off, and unplug the treadmill power cord.

2 Remove the six (6) screws on the treadmill hood.

3 Lift off the hood.

4 Clean inside the unit.

5 Reinstall the hood and the six (6) screws.

6 Plug in the treadmill power cord, and switch on the treadmill circuit breaker.

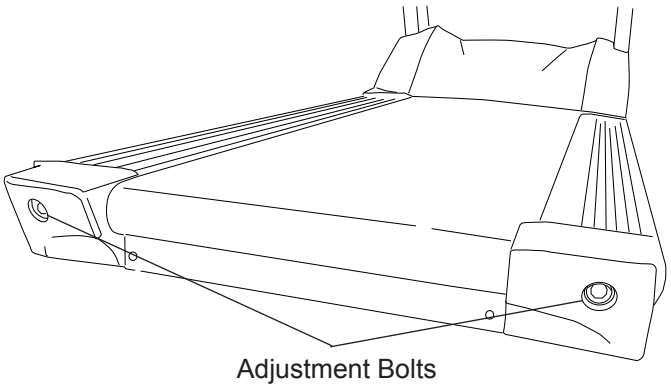
Adjusting Belt Tension

CAUTION

DO NOT USE ALL YOUR WEIGHT TO RESIST THE BELT MOVEMENT. TOO MUCH RESISTANCE APPLIED TOO LONG (MORE THAN TWO SECONDS) MAY SHUT DOWN THE SYSTEM. (VARIOUS ERROR MESSAGES WILL APPEAR IF THIS OCCURS. CYCLE POWER TO RESUME NORMAL OPERATION.)
DO NOT OVERTIGHTEN THE WALKING BELT. DO NOT TORQUE ADJUSTMENT SCREWS BEYOND 80 IN-LBS (9 N-M) MAXIMUM. OVERTIGHTENING THE BELT WILL REDUCE BELT LIFE AND DAMAGE THE ROLLER BEARINGS.

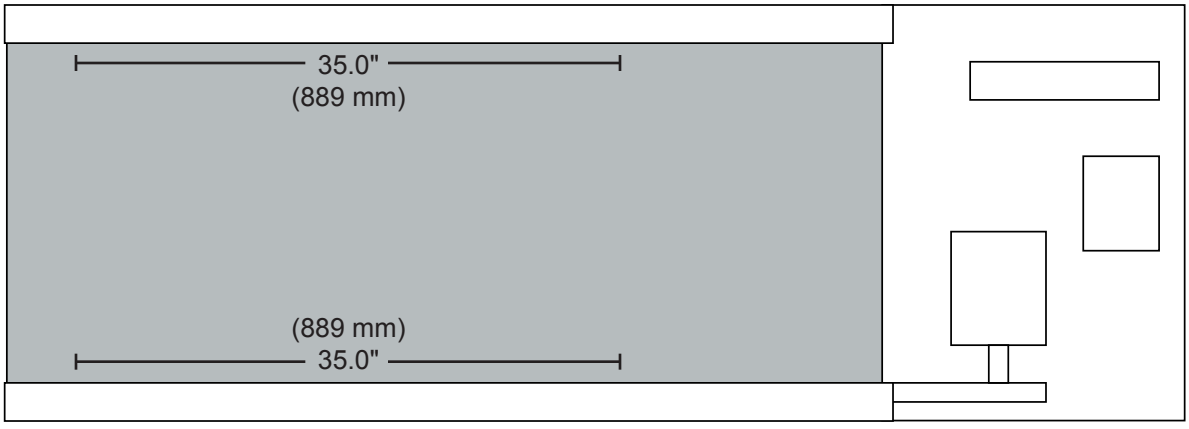
Adjust the belt tension whenever the belt slips or moves unsteadily during operation by following the steps below:

1 Start by loosening the two (2) adjustment bolts.



Adjustment Bolts

2 With the walking belt loose, place two marks 35 inches (889 mm) apart on each side of the belt near the edge. The belt must be loose enough for you to move it from side to side on the front or rear roller.



3 Turn the adjusting bolts clockwise by equal amounts until the marks are between 35-3/16 inches and 35-5/16 inches apart. Proper tension for the walking belt is between .5%–.6%. This should be about six full turns of each adjustment bolt from the point where the belt begins to stretch. Important: Do not exceed 35-5/16 inches.

4 Test the belt by running on the belt at about four mph. Hold the handrail lightly and resist the belt movement with your feet.

5 If you feel the belt slip on the front roller, increase the tension of each adjustment bolt by 1/2 turn and re-test. If you feel the belt slip again, check the tensioner adjustment.

Adjusting Belt Tracking

Perform this procedure whenever the belt moves to one side or the other. Stay off the belt when adjusting the tracking.

1 Start the treadmill at minimum speed and grade.

2 Increase speed to six mph, and make the following adjustment:

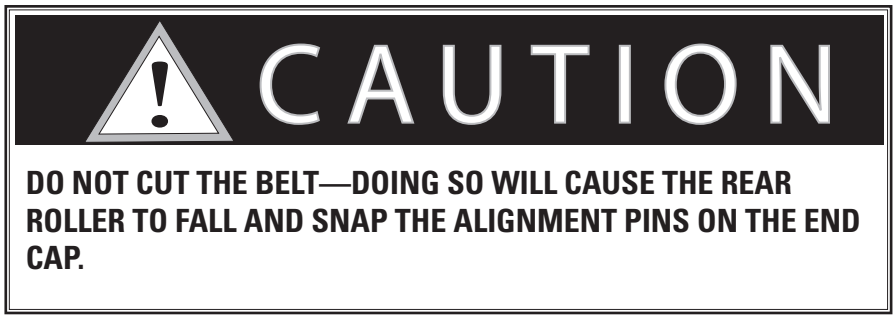
2.1 If the belt moves to the right, turn the right adjustment bolt 1/4-turn clockwise.

2.2 If the belt moves to the left, turn the left adjustment bolt 1/4-turn clockwise.

3 After making an initial adjustment, run the treadmill for five minutes and observe how the belt tracks. If the belt continues to move away from the center, adjust the appropriate side until properly centered.

Replacing the Walk Belt

Perform this procedure whenever the walk belt is still too loose after adjusting the tension or when the belt is worn or frayed.



1.0 Remove the Treadmill Hood

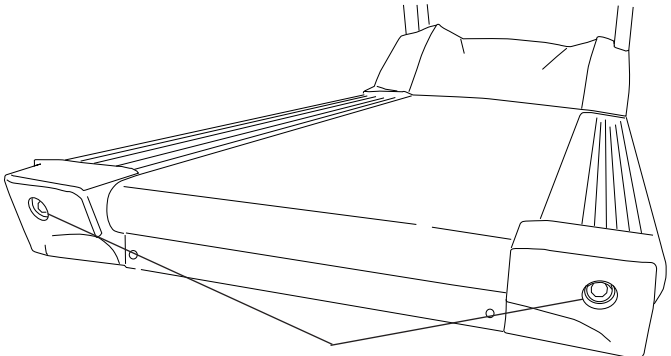
1.1 Turn the treadmill circuit breaker off, and unplug the power.

1.2 Remove the six (6) screws on the treadmill hood.

1.3 Lift off the hood.

2.0 Remove the Rollers

2.1 Remove the end cap by removing the adjustment bolts.

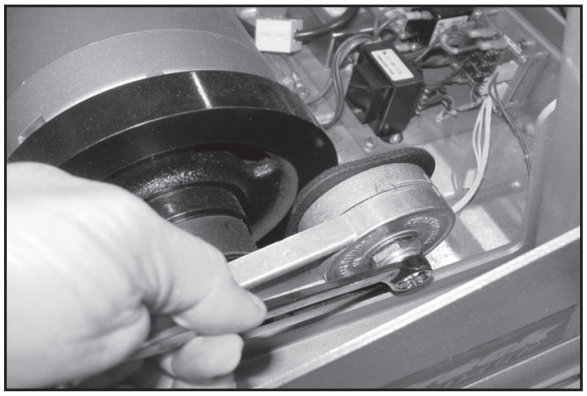


Adjustment Bolts

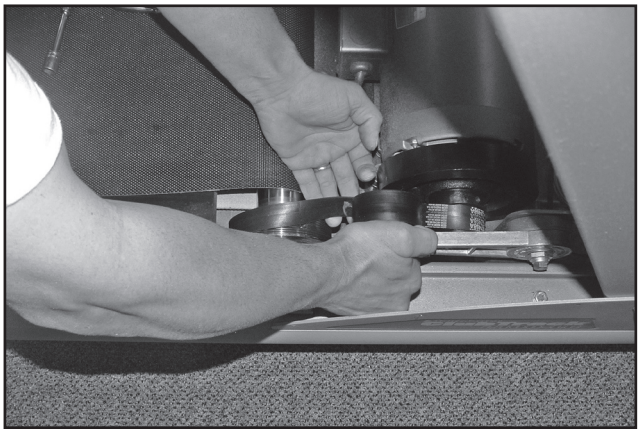
2.2 From the rear of the machine, slide the molding off the side rails.

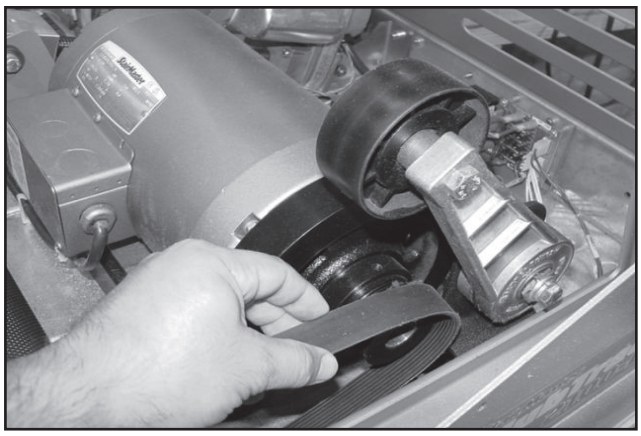
2.3 Remove the rear roller by lifting up the roller and sliding it out from under the belt.

2.4 Place a 9/16 wrench on the head of the bolt mounting the Tensioner and turn counter clockwise until Tensioner loosens.

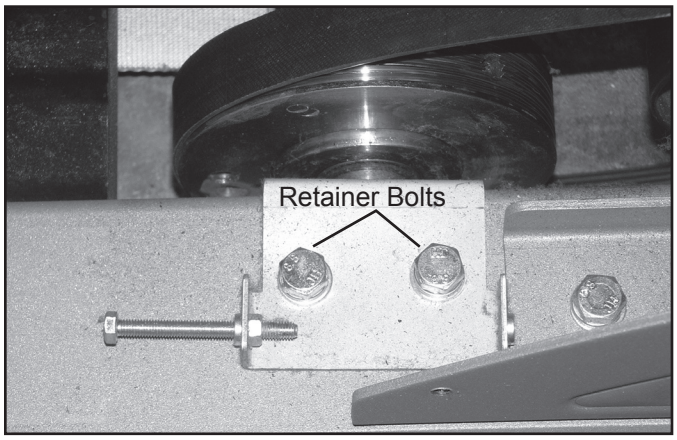


b. Lift up on the Tension Wheel and slide the motor drive belt over pulley to remove.

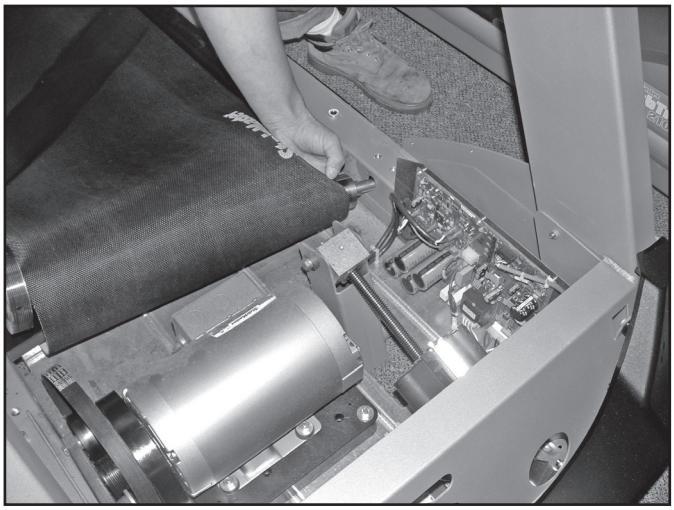




2.5 Remove the two (2) front retainer bolts at each end of the front roller.



2.6 Lift the front roller at its pulley end and pull it out of the opposite side rail. Important: The front roller is heavy; be sure to support both ends.



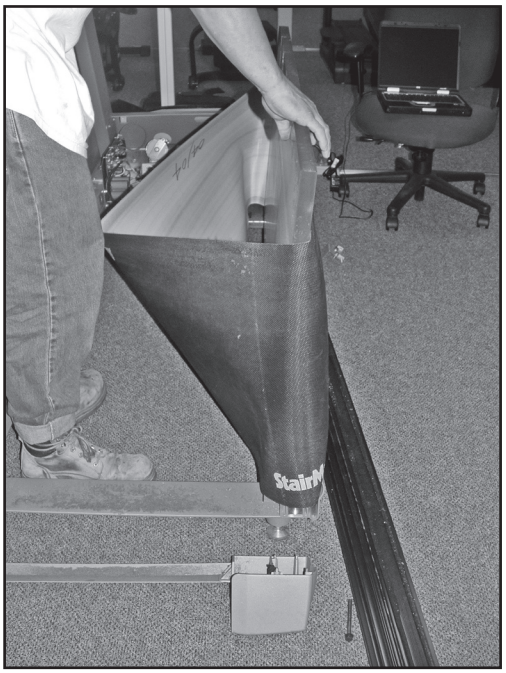
2.7 Slip the motor drive belt off the front roller pulley.

2.8 Fully lift the front roller out from between the walk belt.

3.0 Removing the Deck

3.1 Remove the twelve (12) deck screws that secure the deck to the side rails. Important: Apply pressure on the deck next to the screw to keep the compression mount from turning with the screw; otherwise, you can strip the compression mount threads.

3.2 Lift the deck to one side.



3.3 Slide the deck out from between the belt.

4.0 Inspection and Cleaning

4.1 Check the compression mounts for any wear and cracking. Make sure they are tight.

4.2 Check the deck for signs of wear. Decks are waxed on both sides. If you are flipping the deck, wipe off loose debris with a dry cloth. Inspect the wax on the unused side for deterioration. If the wax appears crusty white and is not adhering to the deck surface, the deck should be replaced. To obtain optimum belt life, always begin with a waxed deck surface. (Refer to the photos below for what is a good deck surface—useable—and what is a bad surface—unuseable.)

Important: Do not apply any cleaners or petroleum products to the deck surfaces.

Wax—Good Side

No Wax—Bad Side

4.3 Inspect the motor drive belt for wear and cracking. Cracking is prevalent between the grooves on the belt.

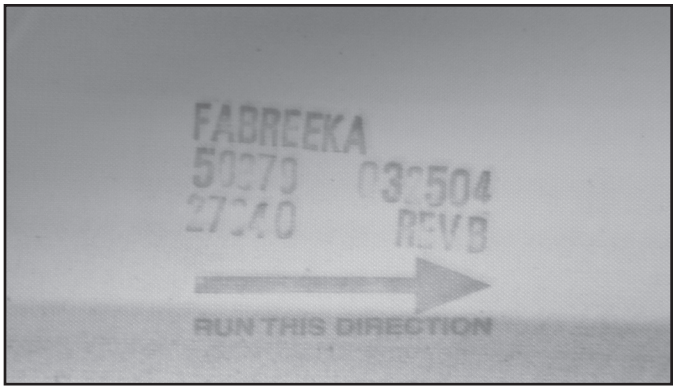
4.4 Inspect the rollers for wax build-up (black deposits on the rollers). Use #000 steel wool or a Scotch-Brite™ pad to clean the wax off the rollers.

4.5 Stand each roller on one end and rotate it. Listen for any squeaking sounds, and verify that the rollers spin smoothly.

4.6 Vacuum the deck and inside the motor housing.

5.0 Installing the New Walk Belt

5.1 Slip the new belt over the deck. Make sure the deck's waxed surface is on the up side and that the arrow on the inside surface of the walk belt points in the proper direction of belt travel.



5.2 Lift the deck with the installed new walk belt and place it on the compression mounts.

5.3 Lift and slide the belt until the arrow is visible on top of the deck. Verify that it points toward the back of the treadmill.

6.0 Attaching the Deck

6.1 Align the deck mounting holes with the compression mounts.

6.2 Install all twelve (12) deck screws and hand tighten.

6.3 Use a 10 mm socket to tighten all the screws. Put pressure on the deck next to the screw you are tightening. Important: Do not over-tighten the deck screws.

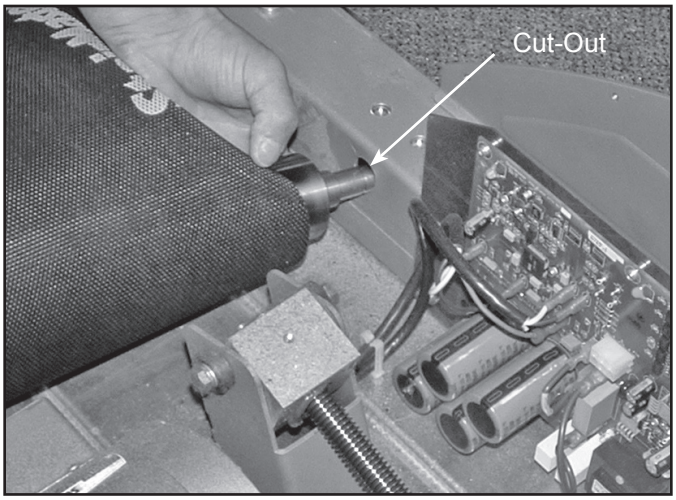
CAUTION

DO NOT OVER-TIGHTEN THE DECK SCREWS. OVER-TIGHTENING THE DECK SCREWS WILL DAMAGE THE COMPRESSION MOUNTS.

7.0 Reinstalling the Front Roller

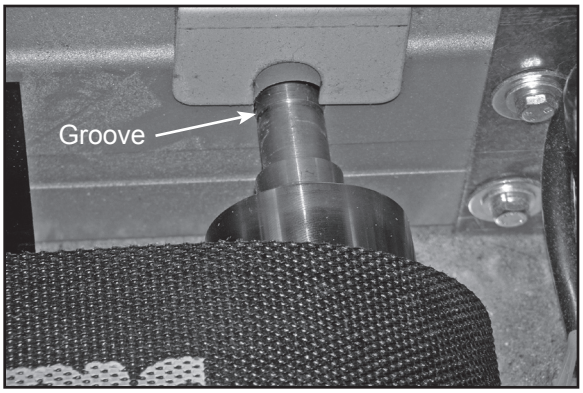
7.1 Slide the front roller inside the walking belt.

7.2 Insert the end of the roller opposite the pulley into the cut-out on the side rail.



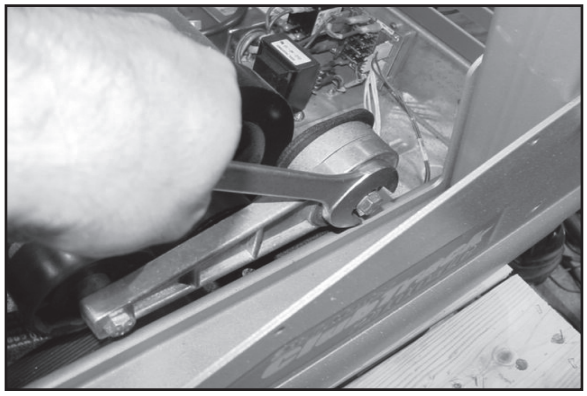
7.3 With your free hand, slip the motor drive belt onto the pulley.

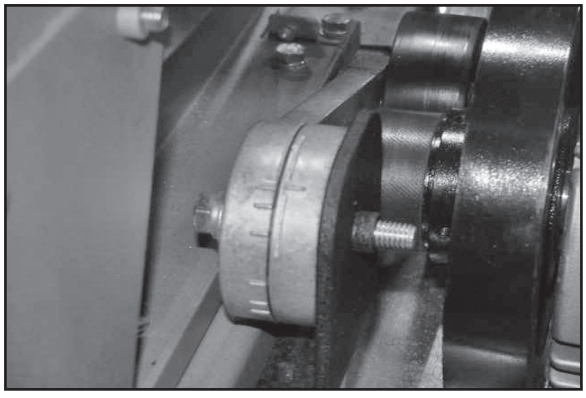
7.4 Install the two front roller retainer plates. Make sure the retainer plates seat in the grooves on the rollers. Tighten all the screws on the retainer plates.



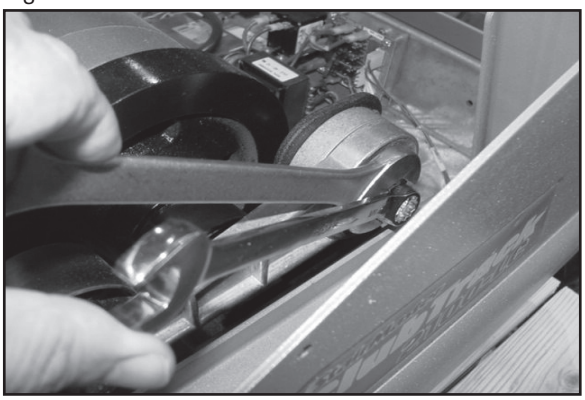
7.5 After alignment of the Front Roller and Flywheel, place belt on the Front Roller and Flywheel.

7.6 Place 5/16 wrench on nut of Tensioner and turn counter clockwise creating tension on the bent and hold. The top two notches should line up.





7.7 Place the 9/16 wrench back on the head of the mounting bolt and turn clockwise, until the bolt tightens.

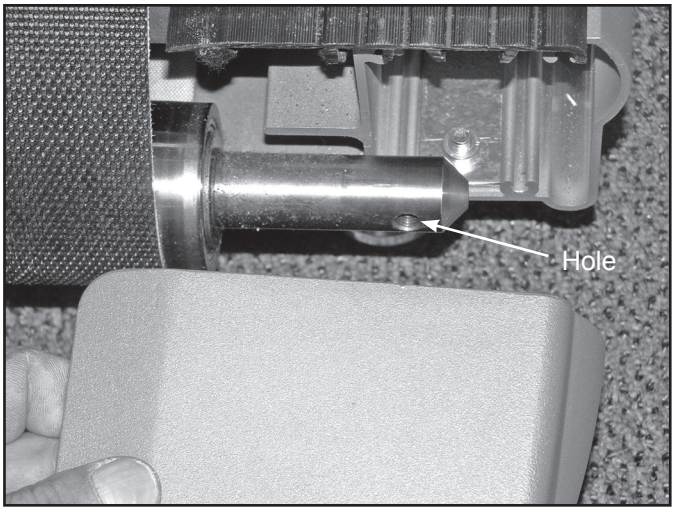


8.0 Reinstalling the Rear Roller

8.1 Slide the rear roller inside the belt and let it hang loose.

8.2 Slide the molding onto the side rails.

8.3 Install the alignment bolts through their holes in the end cap and into the holes on the roller.



8.4 Install the end cap onto the rear of the treadmill, making sure the alignment pins go into the holes on the ends of the side rails.

8.5 Hand tighten the adjustment bolts.

8.6 Align the walk belt so that the edges of the belt are equal distance from the side rails.

8.7 Tighten the adjustment bolts to take the slack out of the walk belt.

8.8 Perform the belt tension and belt tracking procedures outlined on pages 4–6.

9.0 Reinstall the Treadmill Hood

9.1 Install the treadmill hood over the motor compartment.

9.2 Install the six (6) screws in the treadmill hood and tighten.

9.3 Plug the AC power cord into the treadmill, and turn on the treadmill circuit breaker switch.

Replacing the Contact Heart Rate (CHR) Sensors

1 Remove the old sensors.

2 Clean the old adhesive off the plastic contact point using rubbing alcohol.

3 Make sure that the wire connection tab is bent from a *V*-shape to a *U*-shape, and attach the wire to the tab.

4 Peel the paper off the sensor plate's adhesive tape.

5 Press the sensor plate firmly onto the plastic contact point.

6 Install one "zip tie" around each side of the sensor for both the left and right CHR sensors.

7 Using a knife or scissors, carefully remove the "zip ties" from the sensors after 24 hours. Important: The "zip ties" must remain on the sensors for at least 24 hours.

Replacing the Lens

1.0 Removing the Lens

- 1.1 Remove the three (3) T-15 torx screws from the bottom back of the controller.
- 1.2 Remove the seven (7) button head screws that hold the console onto the controller support weldment, and lift the controller off carefully.
- 1.3 Disconnect the contact heart rate wire from the contact heart rate (CHR) module.
- 1.4 Disconnect the ribbon cable from the power control board assembly (PCBA).
- 1.5 Disconnect the communication cable from the PCBA.
- 1.6 Remove the thirteen (13) T-15 torx screws from the back of the controller assembly.
- 1.7 Disconnect the three (3) keypad ribbon cables from the PCBA/processor assembly.
- 1.8 Remove the six (6) screws from the PCBA display/processor assembly and remove it.
- 1.9 Remove the nine (9) screws that hold the lens and remove it from the front controller assembly.

2.0 Reinstalling the Lens

- 2.1 Attach the lens to the front controller assembly with nine (9) screws.
- 2.2 Apply blue Loctite® to the six (6) screws
- 2.3 Attach the PCBA display/processor assembly with the six (6) screws.
- 2.4 Connect the three (3) keypad cables.
- 2.5 Reinstall the controller by repeating steps 1.1–1.6 under "1.0 Removing the Lens" in reverse order.

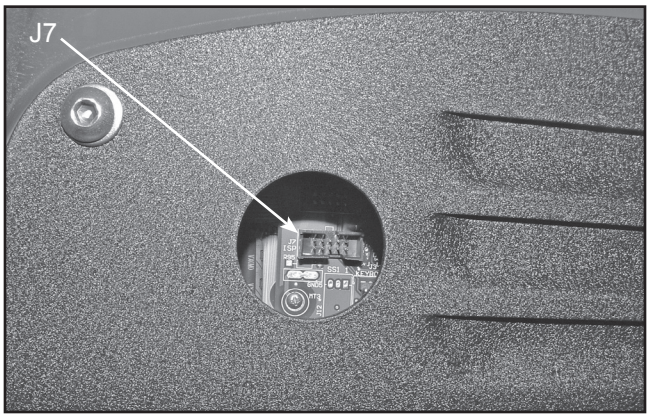
Updating the Console Firmware

WARNING

PLUG P7 and CONNECTOR J7 ARE KEYED. DO NOT CONNECT P7 TO J7 BACKWARDS; OTHERWISE, THE PCBA/PROCESSOR ASSEMBLY CAN BE DAMAGED.

1 Turn the power off.

2 Plug the data ribbon cable from the AVR FISP onto J7. J7 is accessible through the small hole on the left side next to the louvers on the rear of the console. The red line on the ribbon cable will be on the right if the cable is installed properly.



3 Turn power back on.

- The LED on the AVR FISP will flash yellow as data is downloaded to the console.
- When the download is complete, the LED will turn to solid green.
- The download takes one minute.

4 Unplug the AVR FISP ribbon cable from J7.

Part 2

Console Codes

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Overview

There are five groups of console codes as follows: Cardio (codes starting with 2), Owner-Defined Custom (codes starting with 3), Machine Status (codes starting with 4), Diagnostic (codes starting with 6), and Diagnostic 2 (codes starting with 7). Each group of codes is defined below. To access these console codes and the options within each group, follow the instructions for each section.

Cardio

You can customize several default settings on the ClubTrack 2100 to conform to your individual requirements, including changing the:

- default weight,
- workout time,
- age,
- percentage of Maxmum Heart Rate for Target HR in HR Zone Trainer,
- treadmill speed,
- default cool-down time,
- initial speed for Quick Start, and
- incline minimum.

Refer to the following table to scan through and change the cardio settings:

Table 2–1. Defaults

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 2, ENTER**	DEFAULTS
2	**INCLINE UP or INCLINE DOWN**	ENTER WT, RESERVED, ENTER TIME, ENTER AGE, THR PERCENT, SPEED, RESERVED, COOLDOWN TIME, QUICK START, DECLINE
3	**ENTER**	Selected choice
4	**SPEED + or SPEED -**	Default value changes
5	**ENTER**	UPDATING
6	**CLEAR**	DEFAULTS
7	**CLEAR**	THE RESULTS YOU WANT

Refer to the following tables to change individual default workout settings without scanning through all the selections:

Table 2–2. User Weight

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 2, 0**	ENTER WT
2	**ENTER**	ENTER WT 175*
3	**SPEED + or SPEED -**	Weight changes from 50–400 lbs
4	**ENTER**	UPDATING
5	**CLEAR**	THE RESULTS YOU WANT

* Default setting. Setting could be different if the treadmill was customized.

Table 2–3. Exercise Time

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 2, 2**	ENTER TIME
2	**ENTER**	ENTER TIME 20*
3	**SPEED + or SPEED -**	Time changes from 5–99 min
4	**ENTER**	UPDATING
5	**CLEAR**	THE RESULTS YOU WANT

* Default setting. Setting could be different if the treadmill was customized.

Table 2–4. User Age

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 2, 3**	ENTER AGE
2	**ENTER**	ENTER AGE 40*
3	**SPEED + or SPEED -**	Age changes from 10–99
4	**ENTER**	UPDATING
5	**CLEAR**	THE RESULTS YOU WANT

* Default setting. Setting could be different if the treadmill was customized.

Table 2–5. Target Heart Rate

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 2, 4**	THR PERCENT
2	**ENTER**	THR PERCENT 70*
3	**SPEED + or SPEED -**	THR percentage changes from 50–85%
4	**ENTER**	UPDATING
5	**CLEAR**	THE RESULTS YOU WANT

* Default setting. Setting could be different if the treadmill was customized.

Table 2–6. Treadmill Speed

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 2, 5**	SPEED
2	**ENTER**	SPEED MPH 2.0*
3	**SPEED + or SPEED -**	Adjust Speed to acceptable level
4	**ENTER**	UPDATING
5	**CLEAR**	THE RESULTS YOU WANT

* Default setting. Setting could be different if the treadmill was customized.

Table 2–7. Cool-Down Time

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 2, 7**	COOLDOWN TIME
2	**ENTER**	COOLDOWN TIME 2*
3	**SPEED + or SPEED -**	Cool-down time changes from 2–10 min
4	**ENTER**	UPDATING
5	**CLEAR**	THE RESULTS YOU WANT

* Default setting. Setting could be different if the treadmill was customized.

Table 2–8. Quick Start

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 2, 8**	QUICK START
2	**ENTER**	QUICK START 1*
3	**SPEED + or SPEED -**	Starting speed changes from 1–.5 mph
4	**ENTER**	UPDATING
5	**CLEAR**	THE RESULTS YOU WANT

* Default setting. Setting could be different if the treadmill was customized.

Table 2–9. Decline

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 2, 9**	DECLINE
2	**ENTER**	OFF
3	**SPEED + or SPEED -**	Toggles between OFF and ON
4	**ENTER**	UPDATING
5	**CLEAR**	THE RESULTS YOU WANT

* Default setting. Setting could be different if the treadmill was customized.

Owner-Defined Custom

You can customize several owner-defined parameters to conform to your individual requirements, including:

- changing the workout time limit,
- changing the units between English and metric,
- choosing the type of heart rate input,
- choosing the console language,
- changing the contrast,
- changing the treadmill's maximum speed,
- enabling or disabling the sidelight during Intro Mode,
- enabling the magnetic key, and
- resetting the factory defaults.

Table 2–11. Customize

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 3, ENTER**	CUSTOMIZE
2	**INCLINE UP or INCLINE DOWN**	MAX TIME, CHANGE UNITS, HR INPUTS, RESERVED, LANGUAGE, CONTRAST*, MAX SPEED, SIDE LIGHTS, ENABLE MAGKEY, SET DEFAULTS
3	**ENTER**	Selected choice
4	**SPEED + or SPEED -**	Default value changes
5	**ENTER**	UPDATING
6	**CLEAR**	CUSTOMIZE
7	**CLEAR**	THE RESULTS YOU WANT

*Only available on the 2100 LC model.

To customize the owner-defined parameters without scanning through all the selections, perform the following steps for that listed option:

Table 2–12. Max Time

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 3, 0**	MAX TIME
2	**ENTER**	99*
3	**SPEED + or SPEED -**	Time limit of your choosing
4	**ENTER**	UPDATING
5	**CLEAR**	THE RESULTS YOU WANT

* Default setting. Setting could be different.

Table 2–13. Change Units

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 3, 1**	CHANGE UNITS
2	**ENTER**	USA UNITS*
3	**SPEED + or SPEED -**	Toggles between USA UNITS and METRIC UNITS
4	**ENTER**	UPDATING
5	**CLEAR**	THE RESULTS YOU WANT

* Default setting. Setting could be different.

Table 2–14. HR Inputs

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 3, 2**	HR INPUTS
2	**ENTER**	EITHER INPUT
3	**SPEED + or SPEED -**	LOCKED INPUTS, EITHER INPUT, TELEMETRY ONLY, HAND ONLY, BOTH HR OFF
4	**ENTER**	UPDATING
5	**CLEAR**	THE RESULTS YOU WANT

* Default setting. Setting could be different.

Table 2–15. Language

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 3, 4**	LANGUAGE
2	**ENTER**	ENGLISH*
3	**SPEED + or SPEED -**	ENGLISH, GERMAN, SPANISH, FRENCH, ITALIAN, DUTCH, SWEDISH, JAPANESE
4	**ENTER**	UPDATING
5	**CLEAR**	THE RESULTS YOU WANT

* Default setting. Setting could be different.

Table 2–16. Contrast (2100 LC only)

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 3, 5**	CONTRAST
2	**ENTER**	CONTRAST 2.2% 27:45 2.5 MPH*
3	**SPEED + or SPEED - (press and hold)**	Changes contrast in the upper LCD screen
4	**INCLINE UP or INCLINE DOWN (press and hold)**	Changes contrast in the lower LCD screen
5	**ENTER**	UPDATING
6	**CLEAR**	THE RESULTS YOU WANT

* Default setting. Setting could be different.

Table 2–17. Max Speed

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 3, 6**	MAX SPEED
2	**ENTER**	MAX SPEED 12*
3	**SPEED + or SPEED -**	Maximum treadmill speed of your choosing
4	**ENTER**	UPDATING
5	**CLEAR**	THE RESULTS YOU WANT

* Default setting. Setting could be different.

Table 2–18. Side Lights

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 3, 7**	SIDE LIGHTS
2	**ENTER**	SIDE LIGHTS ON*
3	**SPEED + or SPEED -**	Toggles between OFF and ON
4	**ENTER**	UPDATING
5	**CLEAR**	THE RESULTS YOU WANT

* Default setting. Setting could be different.

Table 2–19. Enable Mag Key

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 3, 8**	ENABLE MAGKEY
2	**ENTER**	ENABLE MAGKEY OFF*
3	**SPEED + or SPEED -**	Toggles between OFF and ON
4	**ENTER**	UPDATING
5	**CLEAR**	THE RESULTS YOU WANT

* Default setting. Setting could be different.

Table 2–20. Set Defaults

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 3, 9**	SET DEFAULTS
2	**ENTER**	UPDATING, then DONE
5	**CLEAR**	THE RESULTS YOU WANT

Machine Status

Use the machine status codes to view maintenance information such as the:

- machine run-time hours,
- number of workouts,
- distance traveled,
- console version,
- configuration setting,
- motor drive version,
- machine run-time hours since last cleared (for servicing purposes), and
- the individual program selection count.

To scan through and change the owner-defined codes, perform the following steps:

Table 2–21. Machine Status

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 4, ENTER**	MACHINE STATUS
2	**INCLINE UP or INCLINE DOWN**	RUN HOURS, WORKOUTS, DISTANCE -, CONSOLE VERSION, CONFIGURATION, TM DRIVE VERSION, MAINT HOURS, PROGRAM SELECTION
3	**ENTER**	Value for selected choice
4	**CLEAR**	MACHINE STATUS
5	**CLEAR**	THE RESULTS YOU WANT

To view a particular machine status without having to scan through all the choices, perform the following steps for that listed option:

Table 2–22. Run-Time Hours

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 4, 0**	RUN HOURS
2	**ENTER**	Total run-time hours since last servicing
3	**CLEAR**	THE RESULTS YOU WANT

Table 2–23. Number of Workouts

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 4, 1**	WORKOUTS
2	**ENTER**	Total number of workouts
3	**CLEAR**	THE RESULTS YOU WANT

Table 2–24. Distance Traveled

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 4, 2**	DISTANCE -
2	**ENTER**	Total distance users have traveled using the treadmill
3	**CLEAR**	THE RESULTS YOU WANT

Table 2–25. Software Revision

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 4, 3**	CONSOLE VERSION
2	**ENTER**	CBD2G2 Vxx xxxx (where “x” is the version number)
3	**CLEAR**	THE RESULTS YOU WANT

Table 2–26. Configuration

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 4, 4**	CONFIGURATION
2	**ENTER**	0.5–12 MPH 0–15%
3	**CLEAR**	THE RESULTS YOU WANT

Table 2–27. TM Drive

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 4, 5**	TM DRIVE VERSION
2	**ENTER**	TM DRIVE VERSION xx (where “x” is the version number)
3	**CLEAR**	THE RESULTS YOU WANT

Table 2–28. Maint Hours

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 4, 6**	MAINT HOURS
2	**ENTER**	MAINT HOURS xxx.x (where “x” is the total number of hours since the machine was last serviced)
3	**CLEAR**	THE RESULTS YOU WANT

Table 2–29. Program Selection

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 4, 7**	PROGRAM SELECTION
2	**ENTER**	Program name, followed by the total number of times that program was used)
3	**INCLINE ↓ or INCLINE ↑**	Cycles through program names
4	**CLEAR**	MACHINE STATUS
5	**CLEAR**	THE RESULTS YOU WANT

Diagnostic

Use the diagnostic codes to test various components of the machine such as the:

- display,
- keyboard, and
- serial port.

The diagnostic codes also allow you to get a report on the treadmill's:

- drive bus voltage and
- actual grade setting.

Table 2–30. Diagnostic

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 6, ENTER**	DIAGNOSTIC
2	**INCLINE UP or INCLINE DOWN**	DISPLAY TEST, KEY TEST, SERIAL TEST, RESERVED, RESERVED, RESERVED, RESERVED, RESERVED, BUS VOLTS, GRADE ACT
3	**ENTER**	Selected choice
4	**CLEAR**	DIAGNOSTIC
5	**CLEAR**	THE RESULTS YOU WANT

To scan through the list of diagnostic tests and view diagnostic information:

Table 2–31. Display Test

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 6, 0**	DISPLAY TEST
2	**ENTER**	Display LEDs or LCD pixels in alternating fashion
3	**CLEAR TWICE**	THE RESULTS YOU WANT

Table 2–32. Key Test

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 6, 1**	KEY TEST
2	**ENTER**	PRESS KEY
3	**KEY PANEL KEY (press and hold)**	The name of the key you are pressing
4	**CLEAR TWICE**	THE RESULTS YOU WANT

Table 2–33. Serial Tests

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 6, 2**	SERIAL TESTS
2	**ENTER**	RUNNING, PASS, or FAIL
3	**CLEAR**	DIAGNOSTIC
4	**CLEAR**	THE RESULTS YOU WANT

Table 2–34. Bus Volts

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 6, 8**	BUS VOLTS
2	**ENTER**	BUS VOLTS xxx (where “x” is the drive board bus voltage reading)
3	**CLEAR TWICE**	THE RESULTS YOU WANT

Table 2–35. Grade Act

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 6, 9**	GRADE ACT
2	**ENTER**	GRADE ACT x.x (where “x” is the actual grade setting)
3	**CLEAR TWICE**	THE RESULTS YOU WANT

Diagnostic 2

The DIAGNOSTIC 2 settings allow you to view the machine’s error log and reset or change the maintenance hours between service calls.
To scan through and change the owner-defined codes, perform the following steps:

Table 2–36. Diagnostic 2

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 7, ENTER**	DIAGNOSTIC 2
2	**INCLINE UP or INCLINE DOWN**	ERROR LOG, MAINT HOURS
3	**ENTER (not necessary for maintenance hours)**	Selects the option you want and displays the results
4	**INCLINE UP or INCLINE DOWN**	Error codes
5	**CLEAR**	DIAGNOSTIC 2
6	**CLEAR**	THE RESULTS YOU WANT

To view a particular machine status without having to scan through all the choices, perform the following steps for that listed option:

Table 2–37. Error Log

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 7, 0**	ERROR LOG
2	**ENTER**	ERROR (if any) or NO ERROR
3	**INCLINE UP or INCLINE DOWN**	A list of errors
4	**CLEAR**	THE RESULTS YOU WANT

Table 2–38. Maintenance Hours

Step No.	Press Keys On Console	Display (What you will see)
1	**CLEAR, 7, 1**	MAINT HOURS xxx (where “x” is the current maintenance hours setting)
2	**SPEED + or SPEED -**	Zero or a setting of your choosing
3	**ENTER**	UPDATING
4	**CLEAR**	THE RESULTS YOU WANT

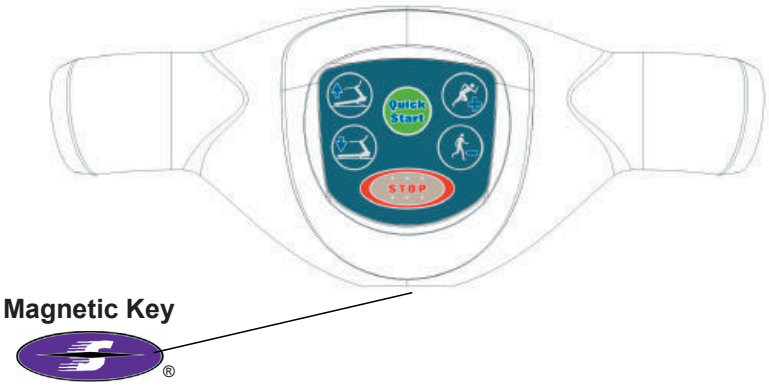
Magnetic Key Limit Access Control

Overview

Limited-access control lets you restrict treadmill use to authorized personnel. It also lets you stop the treadmill in an emergency. The magnetically-activated control is located on the front of the handrail just below the STOP key. The limited-access control is deactivated on machines shipped from the factory.

Activation

Activate the limited-access control and restrict access by placing the magnetic key supplied with the treadmill in the designated area in the front handrail so that the StairMaster® trademark “S” logo on the key faces the user. The magnet will activate the control.



1 Place the magnetic key in its location on the Ergo bar.

2 On the keypad, press **CLEAR**, **3**, **8**, and **ENTER**.

3 Press the **SPEED** or **SPEED** to select "ON."

4 Press **ENTER**.

5 Cycle the power.

The magnetic key feature for the treadmill is now active. If you remove the key, the treadmill belt will stop, and the controller will not respond to any key presses. The console will display a message "REPLACE MAGNET" when you remove the magnetic key from its designated area. You must replace the key or deactivate the control to start the treadmill belt.

Deactivation

1 With the magnet key in place and the display at the opening message "SELECT WORKOUT," press **CLEAR**, **3**, and **8**. The console will display "ENABLE MAGKEY."

2 Press **ENTER**, and the display will either read "ON" or "OFF."

3 Press the **SPEED** or **SPEED** key to toggle between "ON" and "OFF."

4 Select "OFF," and press **ENTER**. The display will show "UPDATING" for a few seconds, then display the off setting.

5 Turn off power to the treadmill at the circuit breaker switch. The circuit breaker switch is located on the bottom front panel of the treadmill.

6 Remove the magnet key.

7 Turn power to the treadmill back on at the circuit breaker switch. The display will show the "SELECT WORKOUT" screen. The limited-access control remains inactive, granting unrestricted access until you turn the magnetic key option back on or place the magnet back in its designated area.

Magnetic Key as an Emergency Stop

The magnetic key has a string with a clip that attaches to your wrist or belt during exercise. If you move too far from the front handrail, the cord will pull the key off and stop the treadmill walk belt.

Part 3

Troubleshooting Electrical Problems

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Common Electrical and Electronic Problems

The following tables provide possible causes and solutions to the most common types of electrical and electronic problems. While the information in these tables may not resolve all problems, they should help you isolate the area affected by the problem.

Table 3–1. Electrical Issues

Problem	Possible Causes	Remedy
There is no display.	Circuit breaker on the treadmill hood is off.	• Set the treadmill circuit breaker to **ON**.
	Treadmill power cord is not plugged in.	• Plug in the power cord, then set the treadmill circuit breaker to **ON**.
	There is no power at the wall outlet.	• Check the building circuit breaker.
	There is an internal electrical problem.	• Refer to the wiring schematics located in this section of the manual.
	There is a blown fuse	• Replace F1, F3, or F4.
Circuit breaker trips during normal operation.	There is a power fault.	• Inspect walk belt for wear.
	There is an insufficient power source.	• Make sure the outlet voltage is 115VAC (USA) or 230VAC (International)
	The treadmill is not on its own dedicated circuit.	• Plug the treadmill into its own 20-amp dedicated electrical outlet.
Treadmill will not change grade.	Fuse is blown.	• Replace blown fuse F2.
	There is an internal problem.	• Cycle the circuit breaker switch on the treadmill. • Replace the grade actuator motor.
Grade actuator motor runs, but grade never changes.	Grade actuator motor is bad.	• Replace the grade actuator motor.

Table 3–2. Electronic Issues

Problem	Possible Causes	Remedy
TM COM ERROR appears on the display at power-up.	Main cable is possibly crimped.	• Replace the main cable.
	Upper display board is bad.	• Replace the console.
Treadmill will not change grade.	VSD board is bad.	• Replace the VSD.
	Old firmware is installed.	• Upgrade the firmware.
Treadmill will not reach maximum speed.	Speed limit control may be activated	• Refer to Part 2 for adjusting treadmill maximum speed.
Treadmill will not reach maximum time.	Time limit control may be activated.	• Refer to Part 2 for adjusting treadmill maximum time.

Table 3–2. Electronic Issues

Problem	Possible Causes	Remedy
Walking belt stops, and no error message appears.	User hit the Ergo stop button.	• Press **START** to resume workout.
	Ergo PCB is not grounded.	• Ground the Ergo PCB.
CHR does not work.	Contact plates have excessive moisture under them.	• Replace the contact plates if cleaning them first does not resolve the problem. • Replace the CHR PCB.

Error Reporting

The current lists of errors are for the firmware version LED 1.0 and LCD 5.0. The system reports various problems to the user via the display. The format includes the text line reporting the error.

Definitions

Warning—A message that appears on the console display that informs you of a condition that requires attention but does not stop treadmill operation.
Error—A message that appears on the console display that informs you of a condition that halts the operation of the treadmill and which requires immediate attention.

Table 3–3. Error List

Label	Type	Response	Description
NO ERROR	N/A	Displayed in the Error Log if no events.	Placeholder label.
PROGRAM ERROR	Error	Start-up—Stops operation.	ALL—Microprocessor fails self-test program memory check sum error. Display will be blank and the console will beep twice.
STATIC RAM ERROR	Error	Start-up—Stops operation.	ALL—Microprocessor fails self-test RAM check sum error. Display will be blank, and the console will beep. It will beep three times for an Internal RAM error. It will beep four times for an external RAM error.
EEPROM ERROR	Error	Start-up—Stops operation.	ALL—Microprocessor fails self-test EEPROM chksum error. All of the EPROM values will be loaded with the defaults. No error message appears.
TM HW COM ERROR	Error	Anytime—Goes to idle. Treadmill slowly stops.	Treadmill UART hardware link failure.
TM COM ERROR	Error	Anytime—Goes to idle. Treadmill slowly stops.	Treadmill E204 drive communication failure low.
DRIVE ERROR	Error	Program operation—Goes to idle. Treadmill stops quickly.	Treadmill E209 output switching fault low.

Table 3–3. Error List

Label	Type	Response	Description
OUT CUR ERROR	Error	Program operation—Goes to idle. Treadmill slowly stops.	Treadmill E208 output current too low.
BELT OVRLD ERROR	Warning	During movement—Displays message until the user presses **CLEAR**.	Treadmill E207 moderate drive overload. Designed to inform the user that the belt or deck will need to be replaced soon.
SYS OVRLD ERROR	Error	Program operation—Goes to idle. Treadmill slowly stops.	Treadmill E203 high drive overload.
DRV MON ERROR	Error	Program operation—Goes to idle. Treadmill slowly stops.	Treadmill E210 current monitoring circuit failure.
CONFIG RQRD	Error	Start-up—Stops operation.	Treadmill E212 configuration not allowed.
GRD LIMIT ERROR	Error	During change—Goes to idle. Treadmill slowly stops.	Treadmill E201 grade position outside limits.
GRD MOVE ERROR	Error	During change—Goes to idle. Treadmill slowly stops.	Treadmill E211 grade system detected an non-requested response.
SPD CHANGE ERROR	Error	Program operation—Goes to idle. Treadmill slowly stops.	TM E(new) drive is commanded to change speed but doesn't.
STUCK KEY	Error	Start-up—Stops operation.	One of the keypad keys are stuck in an active state. Reports only "Stuck key."

Table 3–4. Future Errors

Label	Type	Response	Description
CS HW COM ERROR	Warning	Start-up—Stops CSAFE but continues user selection.	ALL—CSAFE UART hardware link failure.
CS COM ERROR	Warning	Anytime—Stops CSAFE but continues program.	ALL—CSAFE communication failure.
STUCK KEY	Error	Start-up—Locks out key.	Reports which key is stuck.
POWER LOSS	Warning	Anytime—Goes to idle. Treadmill slowly stops.	Loss of power to the motor drive electronics.

Table 3–5. Error Resolution

Error Code	Action
E204	Verify the cable connections at both ends. Check for bent or broken pins, and replace if required. If error persists, replace the VSD or controller as necessary.
E209	Replace the VSD.
E208	Replace the VSD.
E207	Replace the belt or deck if worn; otherwise, press **CLEAR**.
E203	High Motor overload caused by one of the following: **1** Runner heavier than weight / speed envelope in conjunction with significant deck wear. Solution: Restrict use to people within the weight/speed specifications, and check deck wear. Replace if necessary. **2** Motor lead disconnected or loose. Solution: Check the motor leads to ensure all leads are connected. One loose or disconnected lead will cause the overload. **3** Electrical failure on the drive electronics. Solution: Replace the VSD. **4** Motor blocked by obstruction. Solution: Remove the obstruction.
E210	Replace the VSD.
E212	Verify that the 3 jumpers are attached correctly on the VSD board. If problem persists, replace VSD board.
E211	Replace the VSD or grade motor.

VSD

Table 3–6A. LED Patterns for PC Boards P/N - 27920 & 27115.

LED	On	Off
DS1	Only when belt is running	When belt is stopped
DS2	Overload	Normal
DS3	Power to the console	No power to the console
DS4	Normal	VSD problem

Note: If the VSD detects an error, DS1 and DS2 will blink.

Table 3–6B. LED Patterns for PC Board P/N - 41387.

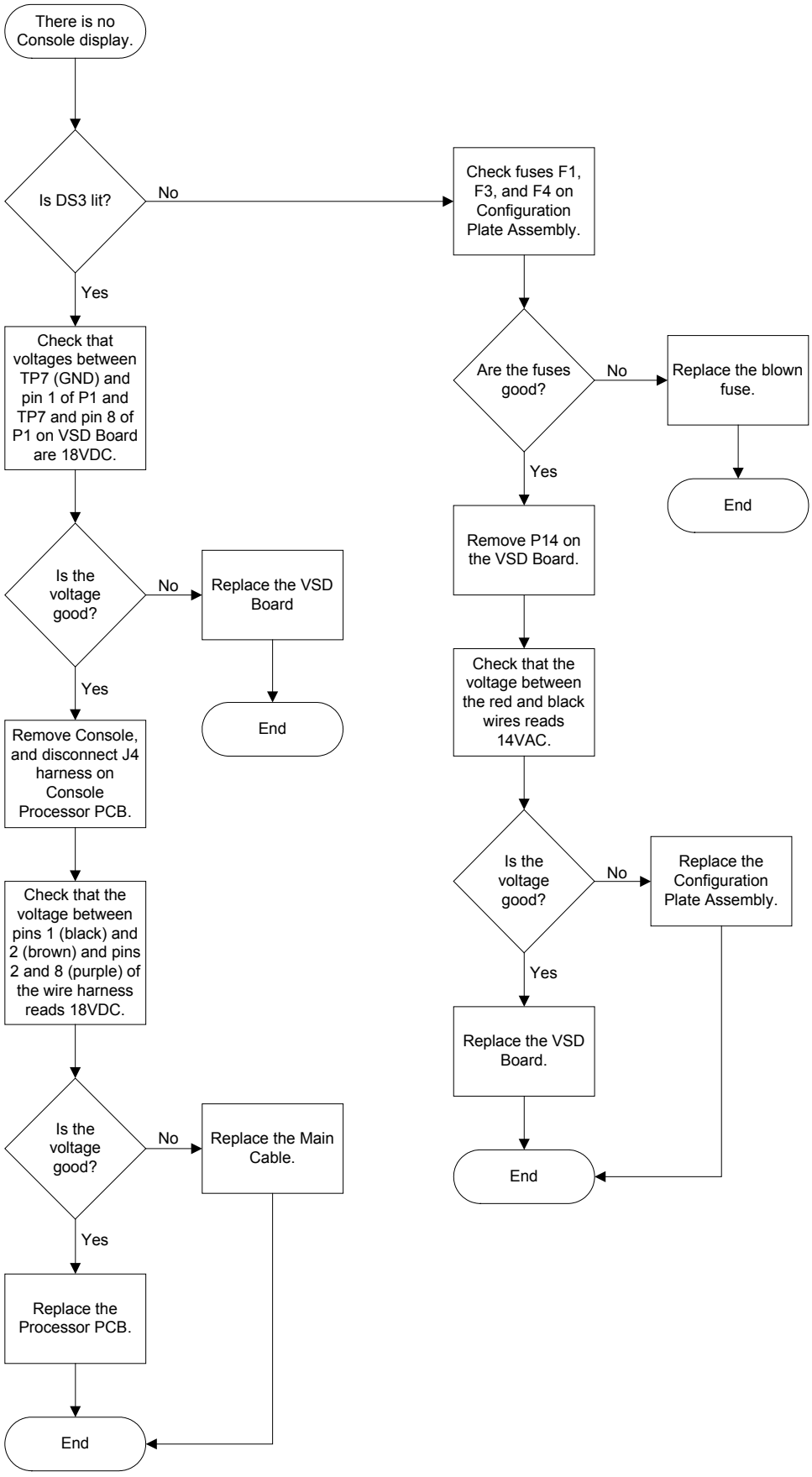
LED	On	Flashing	Off
DS1	Belt is running	*	Belt is stopped
DS2	Motor Overload	* or once per second for proper console communication	No console communication
DS3	Power to the console and Drive Processor	n/a	No power present
DS4	Power to Drive Motor Control Circuits	n/a	No power to P20 or VSD problem

* DS1 and DS2 flashing together indicates an error condition and shows automatic resets of the system.

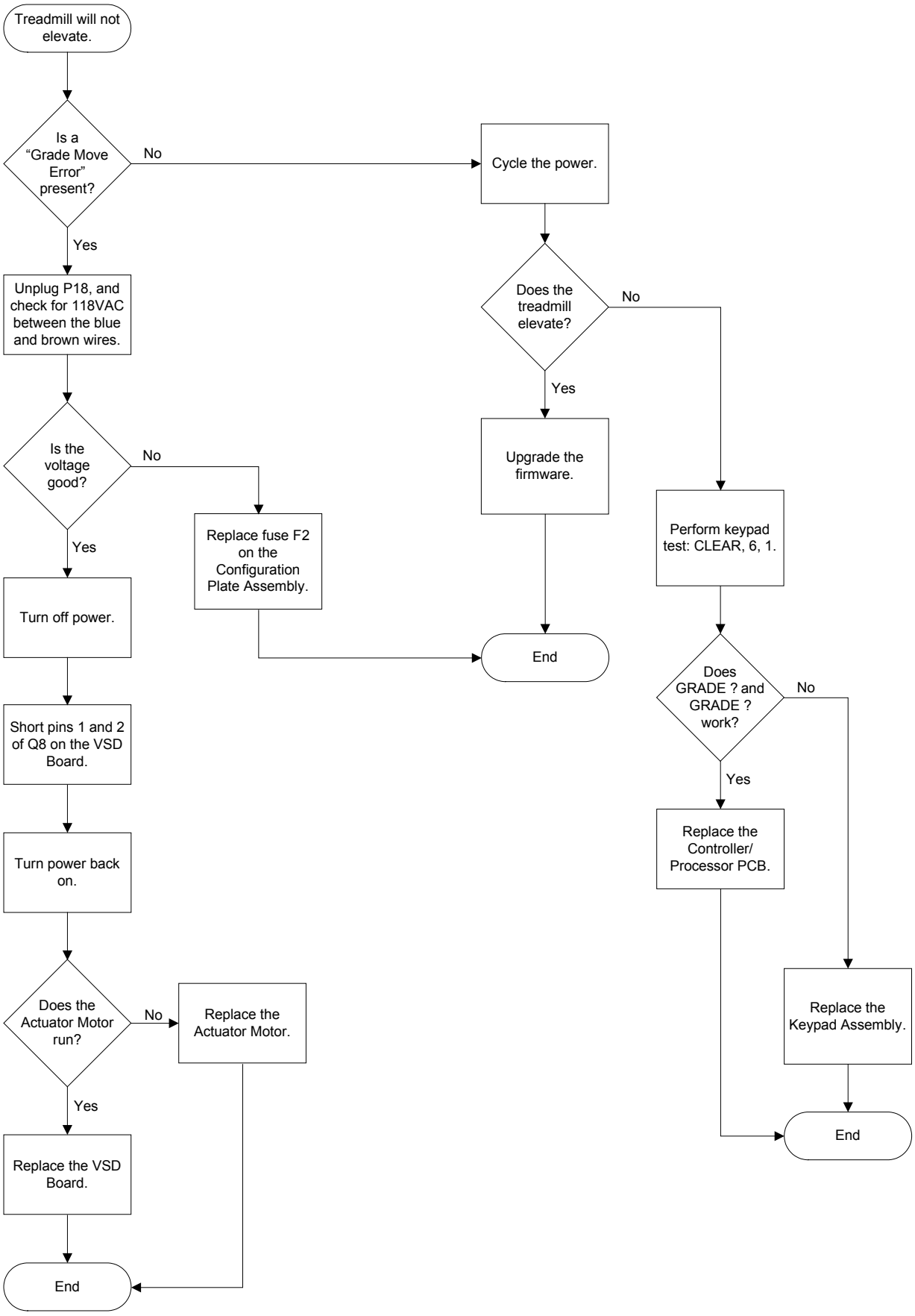
Troubleshooting Flowcharts

Use the flowcharts on the pages 36–40 to help you localize and correct electrical and electronic problems.

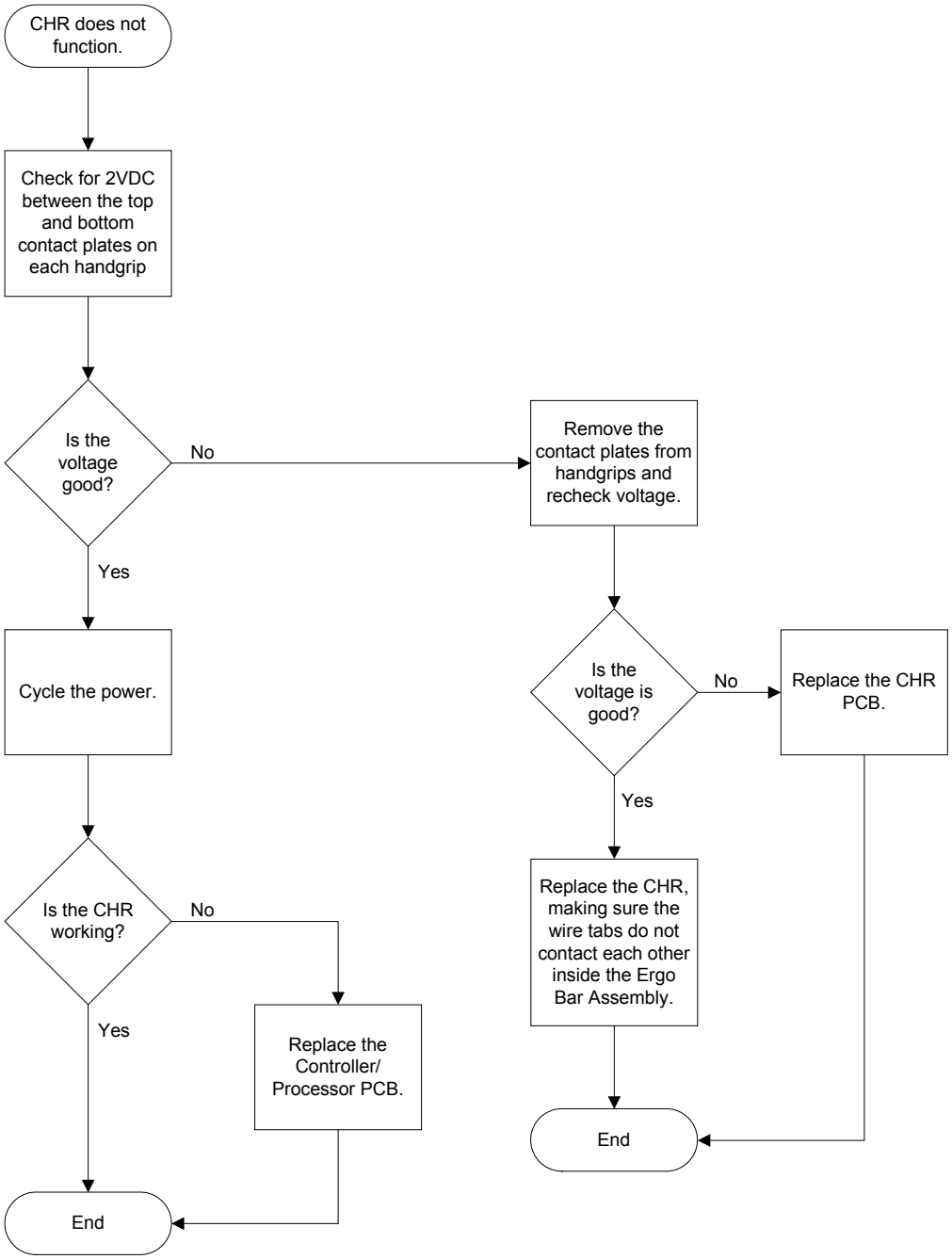
No Display


There is no Console display.
Is DS3 lit?
No
Yes
Check that voltages between TP7 (GND) and pin 1 of P1 and TP7 and pin 8 of P1 on VSD Board are 18VDC.
Is the voltage good?
No
Replace the VSD Board
End
Yes
Remove Console, and disconnect J4 harness on Console Processor PCB.
Check that the voltage between pins 1 (black) and 2 (brown) and pins 2 and 8 (purple) of the wire harness reads 18VDC.
Is the voltage good?
No
Replace the Main Cable.
Yes
Replace the Processor PCB.
End
Check fuses F1, F3, and F4 on Configuration Plate Assembly.
Are the fuses good?
No
Replace the blown fuse.
End
Yes
Remove P14 on the VSD Board.
Check that the voltage between the red and black wires reads 14VAC.
Is the voltage good?
No
Replace the Configuration Plate Assembly.
Yes
Replace the VSD Board.
End

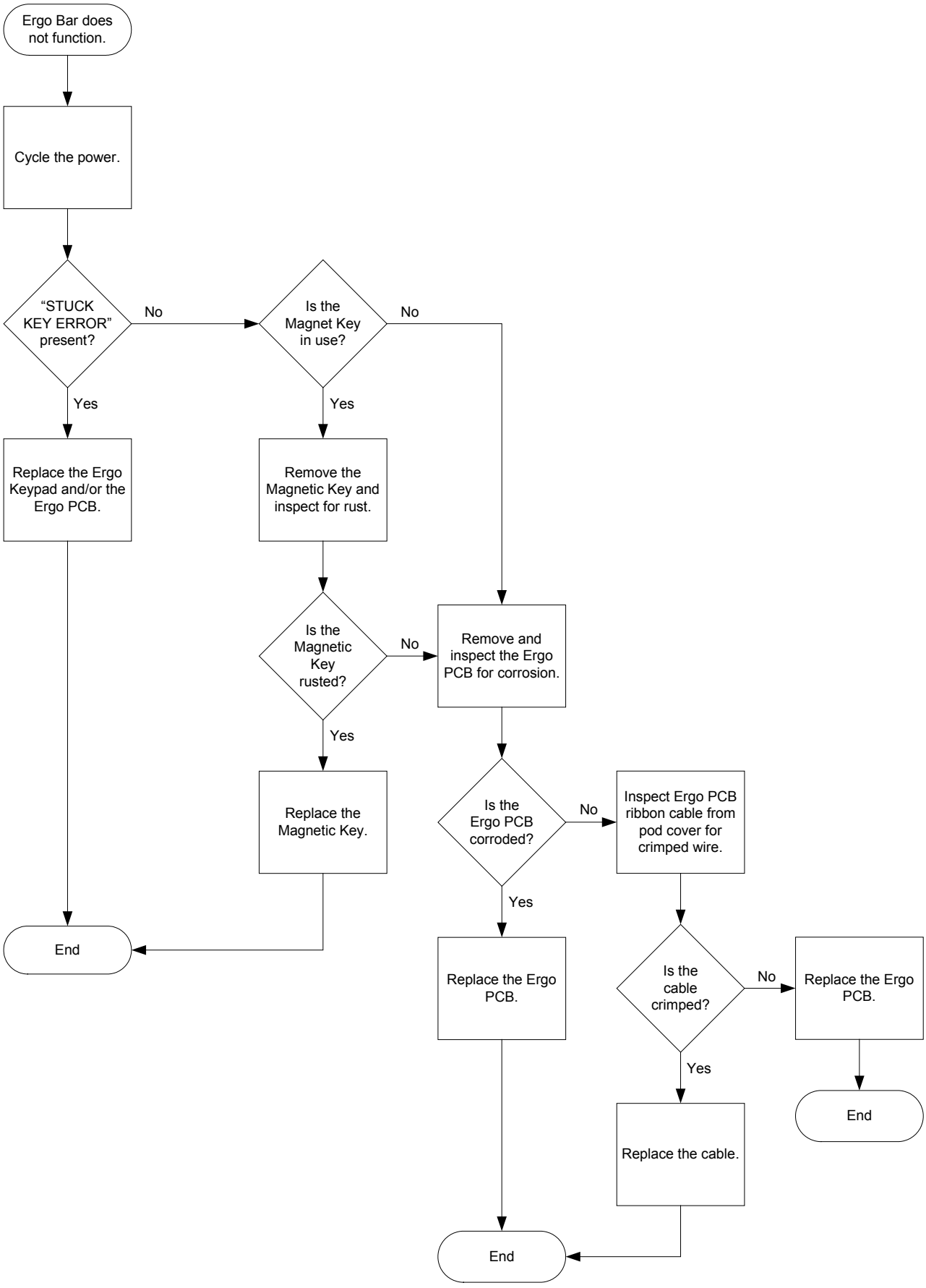
No Elevation Movement



Non-Functional CHR



Non-Functional Ergo Bar



Replacing the Grade Actuator Motor

WARNING

DANGEROUS VOLTAGES ARE PRESENT UNDER THE TREADMILL HOOD. EXERCISE CAUTION WHEN PERFORMING SERVICE TO THE ELECTRICAL COMPONENTS UNDER THE HOOD.

CAUTION

BEFORE REMOVING THE GRADE ACTUATOR MOTOR, PLACE TWO 5-INCH BLOCKS UNDER THE FRONT OF THE TREADMILL TO PREVENT IT FROM DROPPING WHEN YOU REMOVE THE MOTOR.

1.0 Remove the Treadmill Hood

1.1 Place two (2) 5-inch (13 cm) blocks securely under the treadmill headframe.

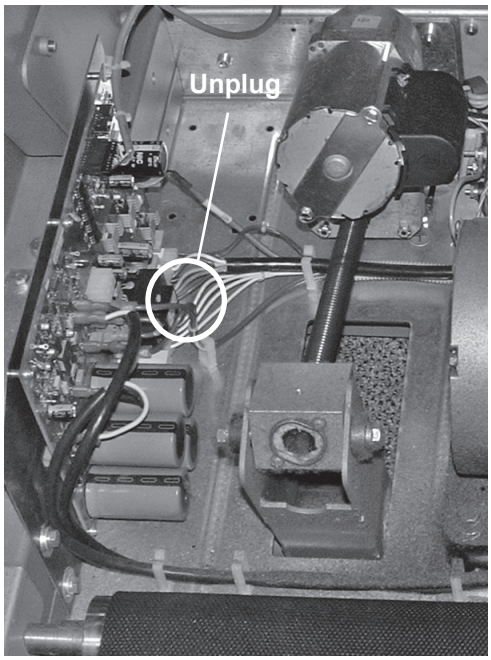
1.2 Turn the treadmill circuit breaker off, and unplug the treadmill power cord.

1.3 Remove the six (6) screws on the treadmill hood.

1.4 Lift off the hood.

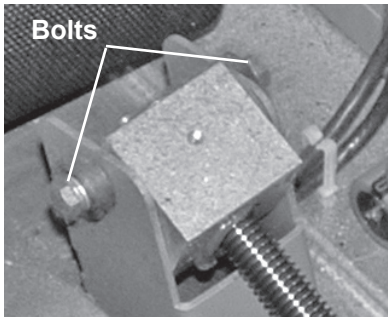
2.0 Remove the Grade Actuator Motor

2.1 Unplug P17 from the VSD board.



2.2 Remove the grade actuator ground wire using a 10-millimeter socket wrench.

2.3 Remove the two (2) 8-millimeter hex bolts and shoulder bushings that secure the swing arm to the grade nut block.



2.4 Remove the 3/8-inch hex bolt, washer, lock washer, and nut from the headframe mounting bracket, and remove the grade actuator motor. The bolt is located underneath the motor.

2.5 Withdraw the steel cylinder bushing from the bronze bearing.

2.6 Unscrew the grade block containing the actuator nut from the actuator drive screw.

2.7 Remove the two (2) 4-millimeter hex screws and lock washers securing the grade nut.

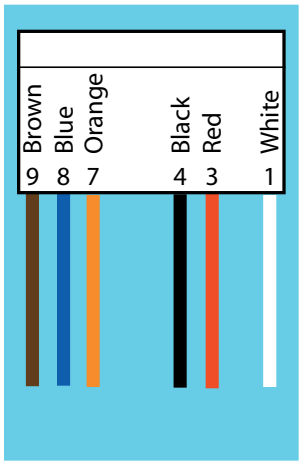
3.0 Install the Replacement Grade Actuator Motor

3.1 Lubricate and insert the steel cylinder bushing on the new actuator bronze bearing.

3.2 Mount the actuator grade motor onto the headframe bracket, and secure the motor with the 3/8-inch hex bolt, flat washer, lock washer, and nut.

3.3 Reinstall the ground wire using screw and star washer previously remoeved in Step 2.2.

3.4 Insert the black wire into pin 4 on P17, as shown below, and plug P17 onto the VSD board, lip-side up.



4.0 Zero the Grade Actuator Motor

4.1 Plug the Actuator cable into the VSD.

4.2 Plug the Power Cord into the outlet and turn the machine on.

4.3 On the console press the "INCLINE UP" key to 4% incline. The shaft on the Actuator will rotate for a short period of time. Wait until it stops.

NOTE: If console displays "Grade Limit Error", turn power off, then back on and repeat Step 4.3.

4.4 On the console press the "DECLINE DOWN" key to 0%. The shaft of the Actuator will rotate in the opposite direction. Wait until it stops.

4.5 Insert a new grade nut into the grade block, and secure it with the two (2) lock washers and 4-millimeter screws.

4.6 Thread the Grade Block Nut onto the Actuator shaft, until the tip of the shaft can barely be seen (two or three threads inside the block).

4.7 Lubricate the grade block, and secure it to the swing arm using the two (2) shoulder bushings and 8-millimeter screws. Tighten the screws until the bushings are flush.

Note: When installing the shoulder bushing, turn the bushings until the flat side of the bushings match the flat side of the mounting holes on the swing arm.

4.8 Press the "QUICK START" key, then "INCLINE INCREASE/DECREASE" keys to verify operation.

5.0 Reinstall the Treadmill Hood

5.1 Install the treadmill hood over the motor compartment.

5.2 Install the six (6) screws in the treadmill hood and tighten.

5.3 Plug the AC power cord into the treadmill, and turn on the treadmill circuit breaker switch.

Problems with the Drive Motor

The 3-phase AC drive motor is equipped with thermal protection circuitry. If you receive a "POWER LOSS" error that consistently reoccurs when the power is cycled to the treadmill, perform the steps below.
To verify if the thermal switch has opened:

1 Unplug P5 and P6 from the VSD board.

2 Ohm between the two wires and verify there is a short. If your reading shows an open circuit, the motor has overheated. Let the motor cool down for 60 minutes to allow the thermal switch to close. If the problem persists, replace the deck and walk belt.

3 If you receive a "POWER LOSS" error after allowing the motor to cool down for 60 minutes; re-check the thermal switch wires as described in step 2. If the continuity test fails (your multimeter reads an "open"), replace the drive motor. If you have continuity between the two thermal switch wires and you receive a "POWER LOSS" error at power-up, replace the VSD.

Important: When replacing the main motor, be sure to install the rubber insulators under the washers. If after replacing the motor the belt runs backwards, swap any two adjacent motor phase wires P7 and P8, or P8 and P9.

Replacing the Drive Motor

WARNING

DANGEROUS VOLTAGES ARE PRESENT UNDER THE TREADMILL HOOD. EXERCISE CAUTION WHEN PERFORMING SERVICE TO THE ELECTRICAL COMPONENTS UNDER THE HOOD.

1.0 Remove the Treadmill Hood

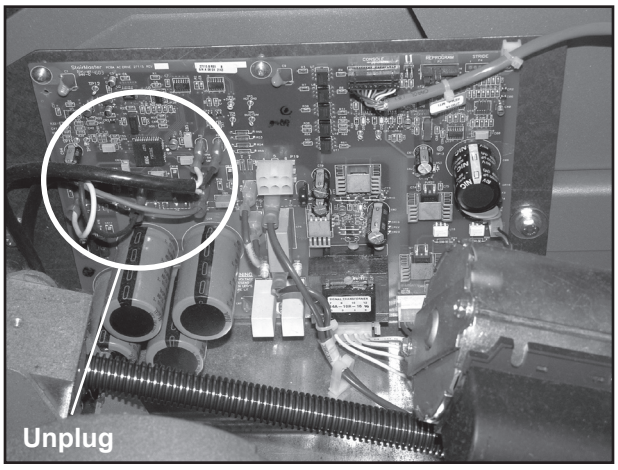
1.1 Turn the treadmill circuit breaker off, and unplug the treadmill power cord.

1.2 Remove the six (6) screws on the treadmill hood.

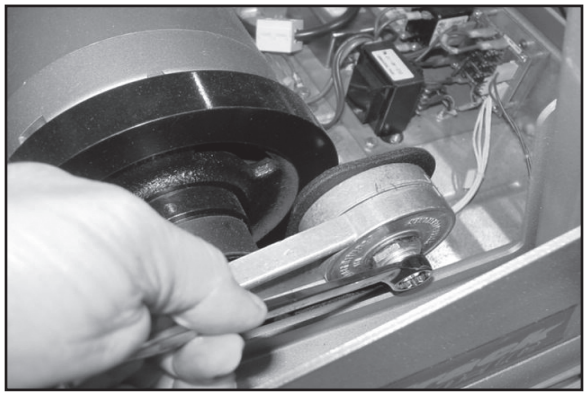
1.3 Lift off the hood.

2.0 Remove the Motor

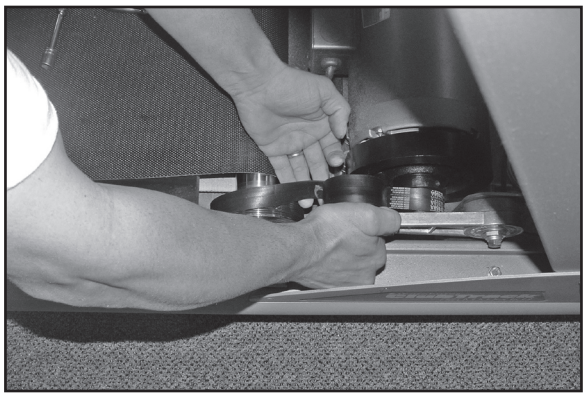
2.1 Disconnect P5, P6, P7, P8, and P9 from the VSD board. (See appropriate wiring schematic on pages 46-48 for the location of where the plugs connect to the VSD board.)

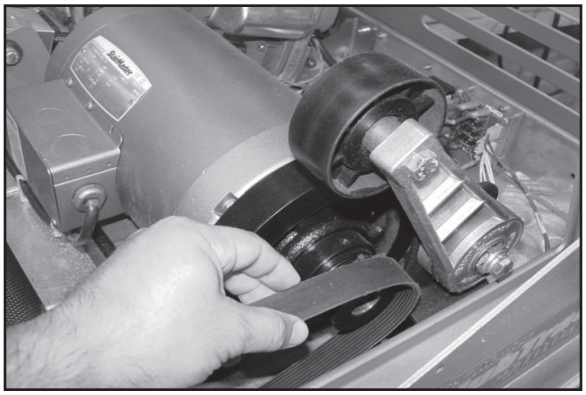


2.2 Place a 9/16 wrench on the head of the bolt mounting the Tensioner and turn counter clockwise until Tensioner loosens.

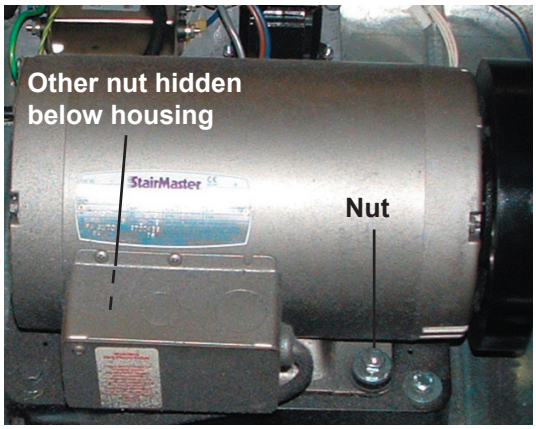


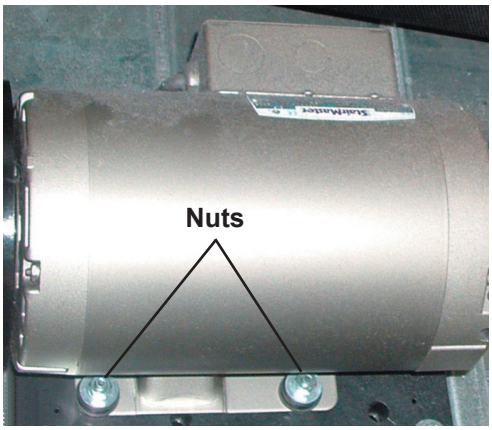
b. Lift up on the Tension Wheel and slide the motor drive belt over pulley to remove.





2.3 Use a 13-millimeter open-end or socket wrench to remove the four (4) hex nuts securing the motor to the headframe, and pull the motor off of the headframe.





2.4 Remove the four (4) washers and rubber isolators from the motor mount studs. Note the arrangement of the isolator mounts.

2.5 Loosen the two (2) set screws fastening the flywheel/drive pulley to the motor shaft, and then remove the flywheel/drive pulley.

3.0 Install Motor

3.1 Install the new flywheel on the new motor shaft.

3.2 Inspect the rubber isolators for wear. If they are bad, replace them.

3.3 Slide the replacement motor onto the headframe motor mount studs.

3.4 Install the rubber isolators and washers onto the studs

3.5 Apply Loctite® to the motor mount studs.

3.6 Install the nuts on the motor mount studs and tighten. **Important:** Tighten the nuts until the lock washers flatten, then turn the nuts 1/2 turn further. **Do not** over-tighten the nuts.

3.7 Connect the five (5) wires from the motor to P5, P6, P7, P8, and P9 on the VSD board.

4.0 Align the Drive Belt

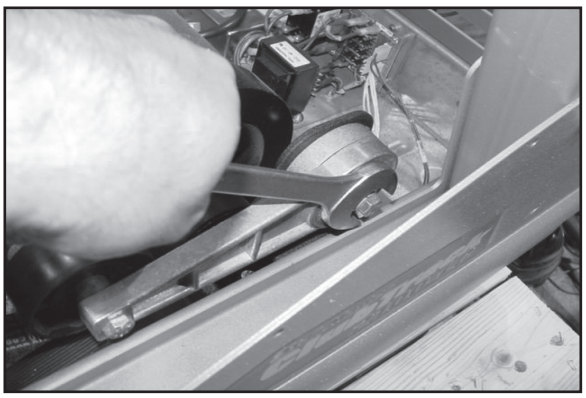
The new motor and flywheel must be aligned with the front roller pulley.

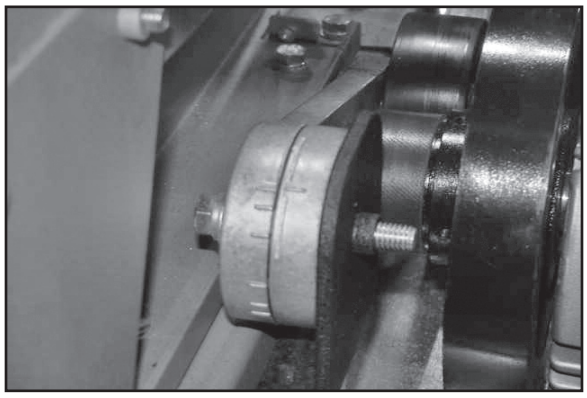
4.1 Use a straight-edged ruler placed on the outside of the front roller pulley to align the outside face of the motor drive pulley to within 0.020 inches (0.5mm) of the straight-edged ruler.

4.2 Tighten the two (2) set screws on the flywheel/drive pulley and tighten.

After alignment of the Front Roller and Flywheel, place belt on the Front Roller and Flywheel.

4.3 Place 5/16 wrench on nut of Tensioner and turn counter clockwise creating tension on the bent and hold. The top two notches should line-up.





4.4 Place the 9/16 wrench back on the head of the mounting bolt and turn clockwise, until the bolt tightens.

4.5 Replace the poly-V drive belt back onto the flywheel/drive pulley.

4.6 Slide the poly-V drive belt back under the tensioner.

5.0 Reinstall the Treadmill Hood

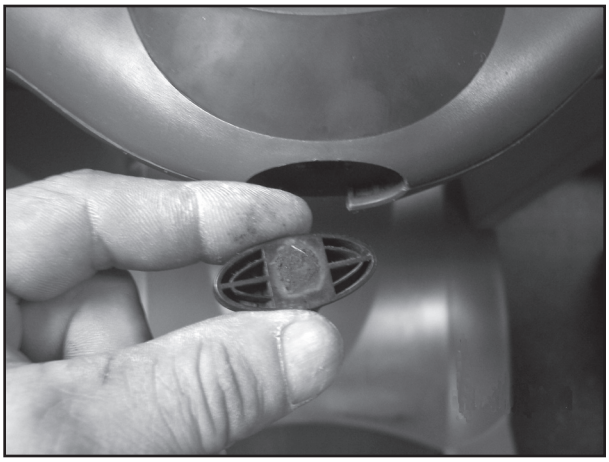
5.1 Install the treadmill hood over the motor compartment.

5.2 Install the six (6) screws in the treadmill hood and tighten.

5.3 Plug the AC power cord into the treadmill, and turn on the treadmill circuit breaker switch.

Magnetic Key Problems

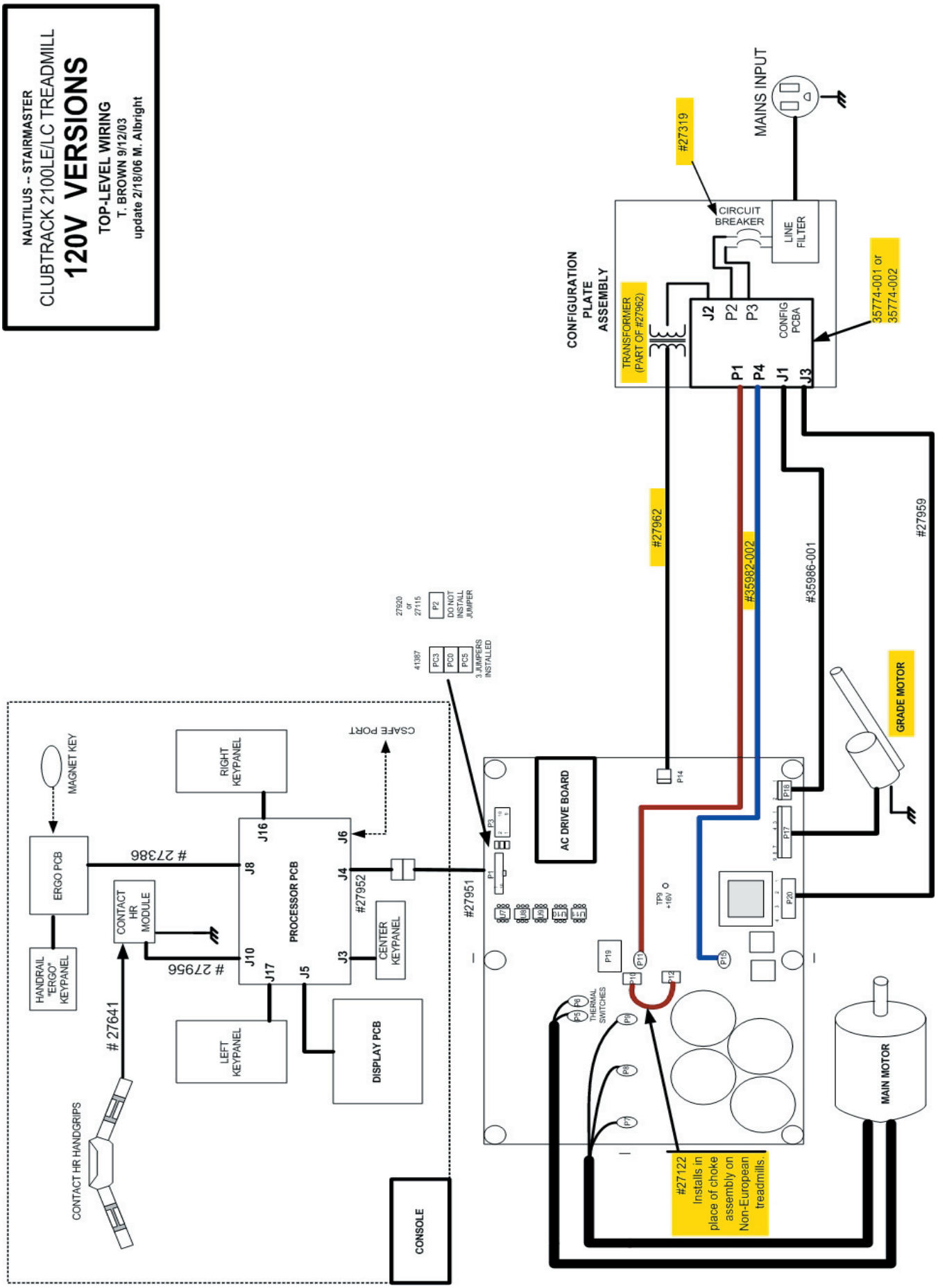
Ergo bar problems include the Ergo bar itself and the magnetic key.
Rust on the magnetic key can cause intermittent "POWER LOSS" and "DRIVE ERROR" messages to appear on the console. The magnetic key should be inspected weekly for signs of rust forming on the magnet. Replace the magnet if it looks anything like the rusted magnet in the picture.

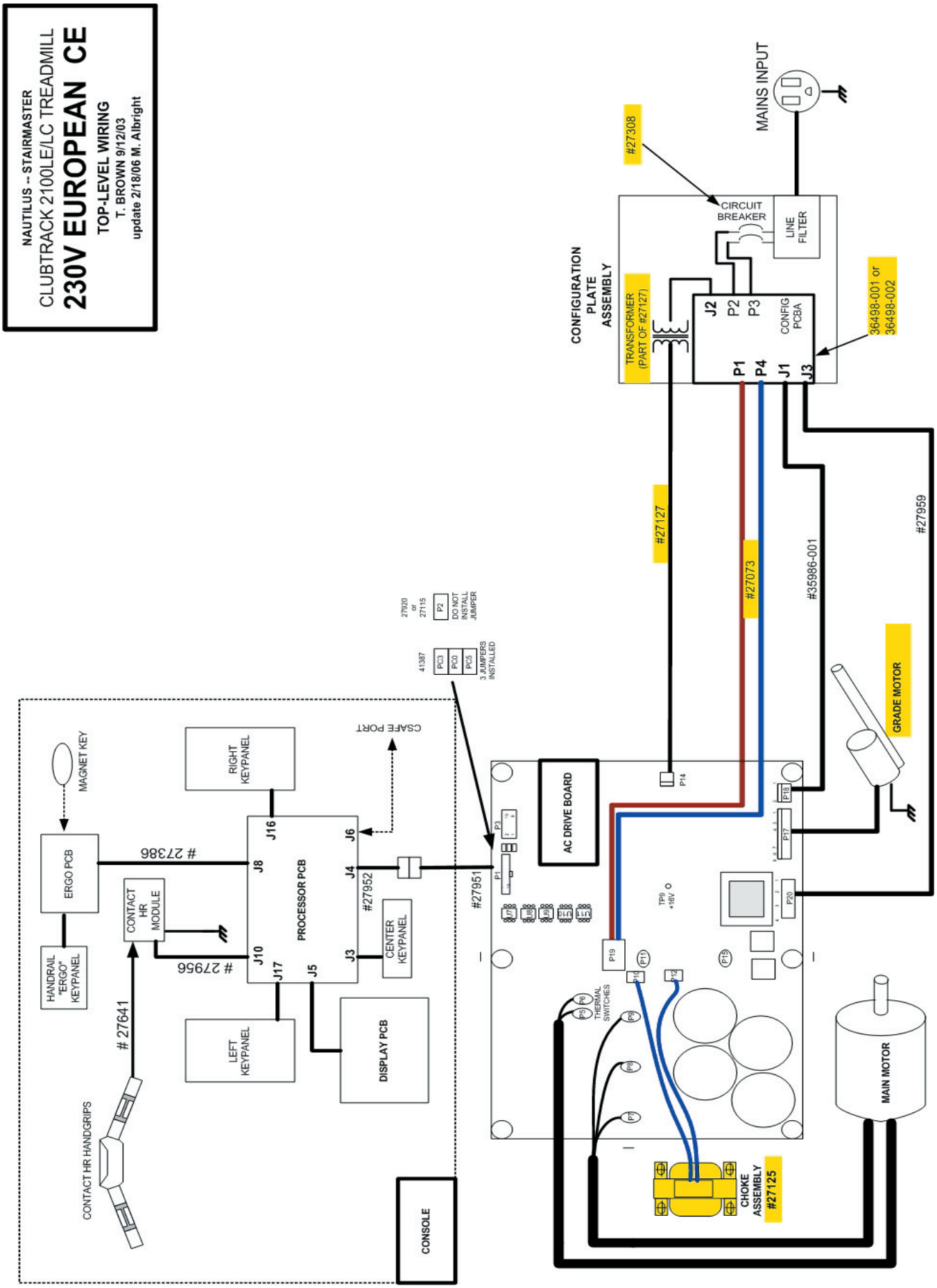


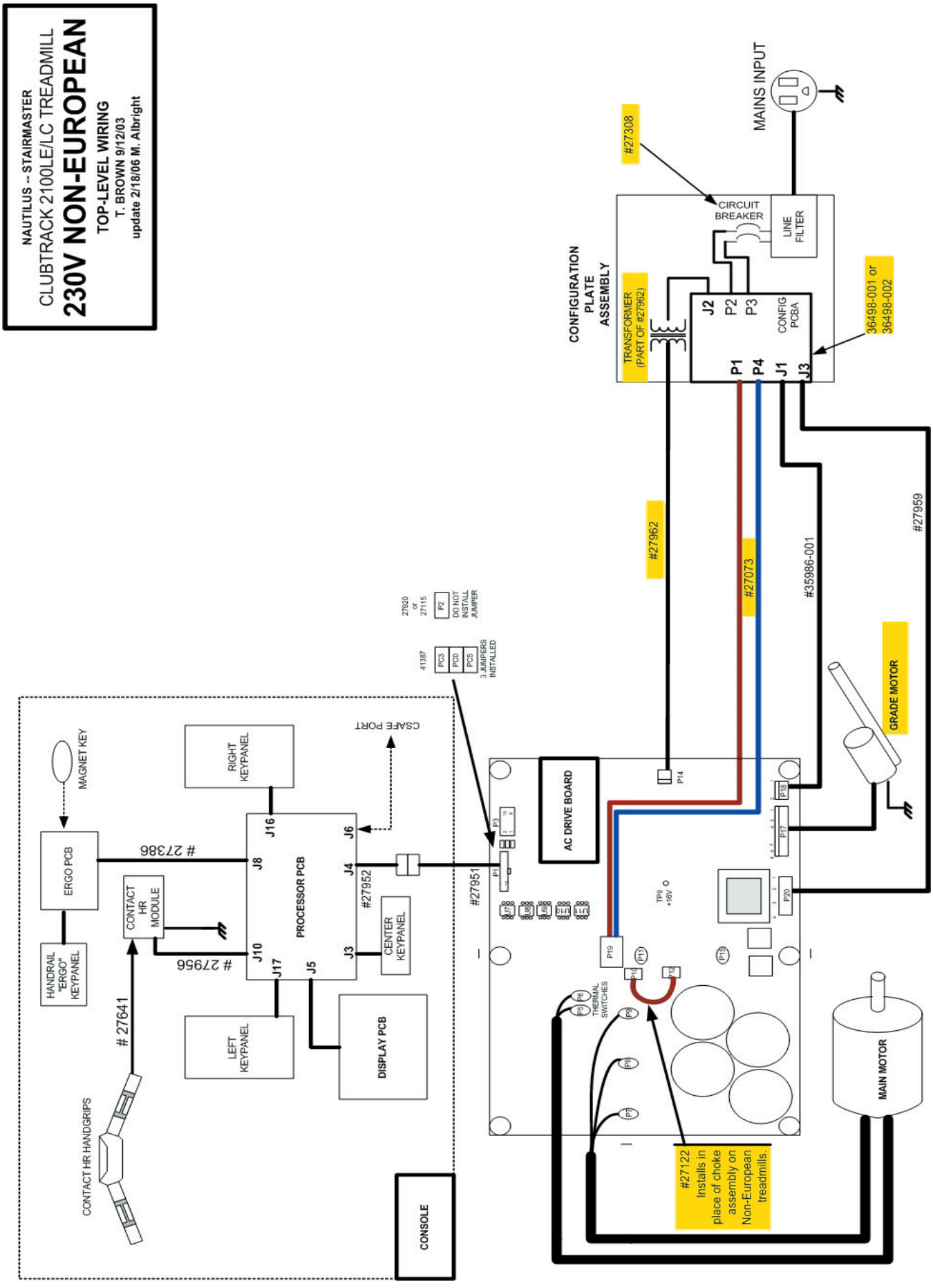
The magnetic's logo "S" should be over the Ergo bar magnetic pick-up bracket.
If the magnetic key is not being used, the Ergo PCB and CHR PCB must be grounded.

Wiring Schematics

Use the schematics on the following pages to assist you in isolating and correcting electrical and electronic problems.


NAUTILUS -- STAIRMASTER
CLUBTRACK 2100LE/LC TREADMILL
120V VERSIONS
TOP-LEVEL WIRING
T. BROWN 9/12/03
update 2/18/06 M. Albright
MAINS INPUT
#27319
CIRCUIT BREAKER
LINE FILTER
CONFIGURATION PLATE ASSEMBLY
TRANSFORMER (PART OF #27962)
J2
P2
P3
CONFIG PCBA
P1
P4
J1
J3
35774-001 or 35774-002
#27962
#35982-002
#35986-001
#27959
GRADE MOTOR
AC DRIVE BOARD
#27951
27920 or 27115
P2
DO NOT INSTALL JUMPER
41387
PC3
PC0
PC5
3 JUMPERS INSTALLED
CSAFE PORT
RIGHT KEYPANEL
MAGNET KEY
ERGO PCB
27386
J16
J6
J8
J4
PROCESSOR PCB
#27952
CONTACT HR MODULE
HANDRAIL "ERGO" KEYPANEL
27956
J10
J17
J5
J3
CENTER KEYPANEL
27641
LEFT KEYPANEL
DISPLAY PCB
CONTACT HR HANDGRIPS
CONSOLE
THERMAL SWITCHES
MAIN MOTOR
#27122 Installs in place of choke assembly on Non-European treadmills.


NAUTILUS -- STAIRMASTER
CLUBTRACK 2100LE/LC TREADMILL
230V EUROPEAN CE
TOP-LEVEL WIRING
T. BROWN 9/12/03
update 2/18/06 M. Albright
MAINS INPUT
#27308
CIRCUIT BREAKER
LINE FILTER
CONFIGURATION PLATE ASSEMBLY
TRANSFORMER (PART OF #27127)
J2
P2
P3
CONFIG PCBA
P1
P4
J1
J3
36498-001 or 36498-002
#27127
#27073
#35986-001
#27959
GRADE MOTOR
AC DRIVE BOARD
P14
P18
P17
P20
P19
P11
P12
P13
P15
TP9 +16V
THERMAL SWITCHES
P6
P5
P9
P8
P7
MAIN MOTOR
CHOKE ASSEMBLY #27125
27920 or 27115
P2
DO NOT INSTALL JUMPER
41387
PC3
PC0
PC5
3 JUMPERS INSTALLED
#27951
P3
P1
CSAFE PORT
RIGHT KEYPANEL
MAGNET KEY
ERGO PCB
27386
J16
J6
J8
J4
#27952
PROCESSOR PCB
CONTACT HR MODULE
CENTER KEYPANEL
HANDRAIL "ERGO" KEYPANEL
27956
J10
J17
J5
J3
27641
LEFT KEYPANEL
DISPLAY PCB
CONTACT HR HANDGRIPS
CONSOLE


NAUTILUS -- STAIRMASTER
CLUBTRACK 2100LE/LC TREADMILL
230V NON-EUROPEAN
TOP-LEVEL WIRING
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DO NOT INSTALL JUMPER
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PC0
PC5
3 JUMPERS INSTALLED
#27951
P3
P1
CSAFE PORT
RIGHT KEYPANEL
MAGNET KEY
ERGO PCB
27386
J16
J6
J8
J4
PROCESSOR PCB
#27952
CONTACT HR MODULE
CENTER KEYPANEL
HANDRAIL "ERGO" KEYPANEL
27956
J10
J17
J5
J3
27641
LEFT KEYPANEL
DISPLAY PCB
CONTACT HR HANDGRIPS
CONSOLE

Part 4

Troubleshooting Mechanical Problems

Contents

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Noises 50

Common Mechanical Problems and Solutions

Table 4–1. Walking Belt

	Problem	Potential Causes	Solutions
1	Walking belt is too far to the left or right.	• The belt is tracking improperly.	• Adjust the tracking. (Refer to Part 1 to correct the problem.)
2	Walking belt slips, but the front roller turns.	• The walk belt tension is improperly set.	• Adjust the belt tension. (Refer to Part 1 to correct the problem.)
3	Walking belt hesitates. Adjusting the walking belt tension is ineffective.	• The motor drive belt is slipping.	• Replace the motor drive belt. • Adjust the motor drive belt tension.
		• The VSD is bad.	• Replace the VSD.

Table 4–2. Noises

	Problem	Potential Causes	Solutions
1	There is a grinding sound.	• There is a bad roller bearing.	• Replace the roller.
		• The motor has a bad bearing.	• Replace the motor.
2	Banging noise when the person is running.	• One or more compression mounts are worn (normally the ones in the front).	• Replace the compression mounts.
3	There is a squeaking noise when you walk on the deck.	• The unit may not be level.	• Check the leveling feet.
		• The deck is contacting the side rails.	• Replace the deck.
4	There is a squeaking noise all the time when the belt is running.	• The motor drive belt is worn.	• Relace the motor drive belt.
		• The motor drive belt is misaligned.	• Make sure the grooves on the belt are seated correctly in the grooves on the front roller pulley and the motor flywheel.
		• The motor flywheel is misaligned.	• Realign the motor flywheel with respect to the front roller pulley.

Note: Remove the motor drive belt to isolate if the problem to a roller or the drive motor.

Part 5

Assembly Illustrations

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Hood Assembly and End Caps 65
Hand Grips and Ergo Bar 66
Cabling 67

PCBA.....68
Controller Keypanel.....69
Controller Bottom Housing 70

Assembly Parts Lists

Part number information in the following table is meant to help you identify the parts in the drawings. They are not intended for use in ordering replacement parts. To order replacement parts, refer to Appendix C.

Table 5-1. Part Identifier List

Part #:	Description:	Qty:
10011-070	Decal, Ground	1
12497	Contact Plate, CHR	4
12506	Adhesive Transfer Tape, 5 MIL	4
22016	Screw, .375-16x2.50 Hex Hd Cap	3
22027	Washer, Split Lock .250	8
22077	.375 Nut, Hex	2
22160	Screw, #6 x.38 Thread Forming Phillips	1
22845	Washer, 1 1/4 x 17/32	4
22878	Screw, Set 0.25-28x0.375	2
23729	Washer, Split Lock 3/8	3
27068	Bracket, Actuator	1
27069	Assembly, Bracket, Actuator	1
27300	Felt, Adhesive-Backed	6
27350	Decal, StairMaster Right, 2100	1
27351	Decal, StairMaster Left, 2100	1
27377	Washer, M8, Flat Stainless	16
27378	Washer, M6, Flat Stainless	4
27379	M8 x 1.25 x 16 Button Head	10
27386	Assemly, Cable C50 ErgoBar	1
27388	Flywheel, Cast	1
27410	Plate, Motor Mounting	1
27415	Plug, Hole, Rib-Lock	2
27417	Roller Assembly, Drive	1
27424	Block, Grade Nut	1
27425	Support, Grade Weldment, Machined	2
27426	Assembly, Nutplate, Foot	2
27430	Bracket Assembly, Tensioner	1
27436	Guard, Foot	1
27441	Washer, Shoulder Isolation	4
27443	Bushing Spanner	2
27444	Bushing Shoulder	2
27458	Drive Belt, Poly-V	1
27467	Pulley Assembly, Rear	1
27469	Retainer Cover	14
27477	Hood	1

Part #:	Description:	Qty:
27478	Cover Trim, Front	1
27485	Weldment, Grade	1
27487	Drive Motor, AC Variable	1
27488	Assembly, VSD, 2100	1
27489	Plug, 1.50 Sheet Metal	2
27490	Weldment, Upright	1
27535	Bed, Slider, 612/2100	1
27536	Extrusion, Sidewall Cover	2
27537	M3 x .50 x 12 Screw, Sem, PHP, Ext Star	12
27540	Washer, M3, Flat, Zinc Plated	6
27541	Bushing, Bronze	2
27542	M6 x1.0 x 16 Button Head	10
27543	Compression Mount, Long	10
27544	Compression Mount, Deck	8
27551	Wheel, Polyoefin	2
27552	Rotary Tensioner	1
27556	Bushing, Grade Adjust	2
27559	M8 x 1.25 x 70 Button Head	8
27561	M8 x 1.25 Hex Nut	6
27562	Washer, .490 x 1.063 x .093, Neoprene	8
27563	M8 x 1.25 x 60 Hex Head Cap	8
27564	Washer, M8, Flat Fender, Zinc Plated	18
27565	Washer, M6, Flat, Black Oxide	2
27566	Washer, M6, Split Lock Black	2
27567	M6 x 1.0 x 16, Button Head Black	2
27568	Washer, M8, Flat, Black Oxide	2
27569	M8 x 1.25 .90 Hex Head Cap, Black	2
27570	Clamp, VSD Board	1
27571	Pad, VSD Clamp	1
27573	Nut, M5 x 0.8 Hex	2
27574	M5 x 0.80 x 50 Hex Head Cap	2
27575	Washer, M6 Flat, Wide Zinc Plated	16
27576	M6 x 1.00 x 35 Hex Head Cap	14
27577	M6 x 1.00 x16 Hex Head Cap	4
27578	Washer, M6 Split Lock	8

Part #:	Description:	Qty:
27579	Washer, M6, Flat Zinc Plated	2
27582	Rivet, .1875 Dia x .375 Grip, Black	14
27583	Guide Wire .500	10
27585	Washer, .406 x 1.25 x .047 Steel Zinc	5
27586	Spacer Nylon	4
27587	Washer, M10 Flat Zinc Plated	4
27588	Washer, M10 Split Lock	4
27590	M8 x 1.25 x 20 Hex Head Cap	28
27591	Washer, M8, Flat Zinc Plated	36
27592	Washer m8 Split Lock	64
27593	M8 x 1.25 .25 Hex Head Cap	10
27594	.25-20 x .75 Thread Cutting, Hex Washer Hd	8
27595	Plate, Grade Nut Block, Mounting	1
27601	Insert, Threaded, Metric 6MM	18
27602	Insert, Treaded, Metric 8MM	6
27605	M10 x 1.50 x 30 Hex Head Cap	4
27612	Screw M3 x 0.5 x 10, Self Tapping Pan Hd Torx	6
27631	Housing ErgoBar, Left Upper	1
27632	Housing ErgoBar, Left Lower	1
27633	Housing ErgoBar, Right Upper	1
27634	Housing ErgoBar, Right Lower	1
27640	Belt, Walking	1
27641	Wire Harness, Contact Heart Rate	1
27646	Machined Extrusion Right Hand	1
27647	Machined Extrusion Left Hand	1
27648	Assembly, Endcap, Siderail Left	1

Part #:	Description:	Qty:
27649	Assmebly, EndCap, Siderail Right	1
27650	Weldment, Rear Frame Support	1
27654	Leveling Pad (.500-13 UNC-2A x 1.88 BASE)	2
27660	Assembly, Upright Support RH	1
SM10259	PCBA, ErgoBar	1
27666	Grill, Front Cover	1
27675	Assembly, Retainer, Front Roller Shaft	2
27676	Spacer, Soft Deck	2
27677	Siderail, Stiffner Assembly LH	1
27678	Siderail, Stiffner Assembly RH	1
27679	Assembly, Upright Support LH	1
27681	Housing ErgoBar Mid Lower	1
27682	Logo, StairMaster	1
27684	Weldment, Controller Support	1
27689	Steel Headframe Assembly	1
27764	Screw, Thread Forming #6-32 x .375	4
27903	Decal, Magnetic Switch 2100	1
27951	Assembly Cable, Lower C50 Comm	1
27952	Assembly Cable, Upper C50 Comm	1
27959	Assembly Config Cable	1
28390	EndCap, Round 2"	2
35901-033	M6 x 1.00 x 16 Hex Head Cap	2
36209	Insert, Threaded, Metric, 6MM	4
SM27664	Keypanel W/Ergo Bar housing	

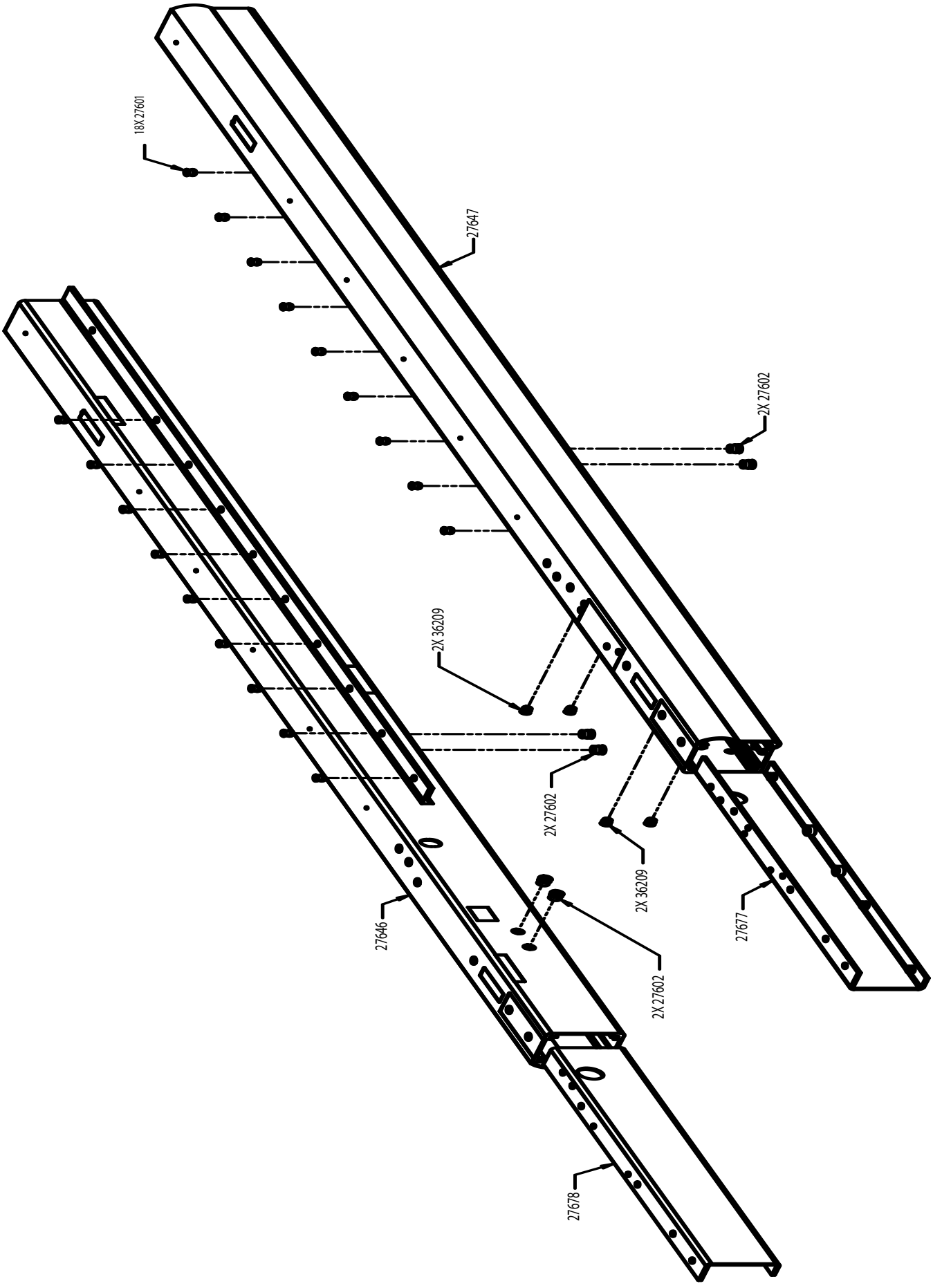
Assembly Drawings Overview

The information in the table below refers to specific notes, represented by 1. found on the drawings in the section. Refer to these notes when replacing parts because they mention critical torque specs.

The symbol B throughout the drawings refers to the assembly revision.

Table 5–2. Notes Pertaining to Assembly Drawings

Note No.	Note
1.	Torque fastener to 70 inch pounds (8 Nm).
2.	Torque fastener to 188 inch pounds (21 Nm).
3.	Torque fastener to 35 inch pounds (4 Nm).
4.	Torque fastener to 240 inch pounds (27 Nm).
5.	Torque fastener to 10 inch pounds (1 Nm).
6.	Torque fastener to 44 inch pounds (5 Nm).
7.	Torque fastener to 16 inch pounds (9 Nm).
8.	Apply grease to the surface before assembly.
9.	Apply Hernon 423 to the threads before assembly.
10.	Torque fastener to 60 inch pounds (7 Nm).
11.	Torque fastener to 30 inch pounds (3 Nm).
12.	Cut to 2 inch (5 cm). Apply to top center EndCap rib
13.	Apply Silicone sealant Part Number 62998 at cable slot on Part Number 27680.
14.	Seal cable on Part Number 27912 at opening in Part Number 27680 with Silicone sealant Part Number 62998.


18X 27601
27647
2X 27602
2X 36209
2X 27602
2X 36209
27677
27646
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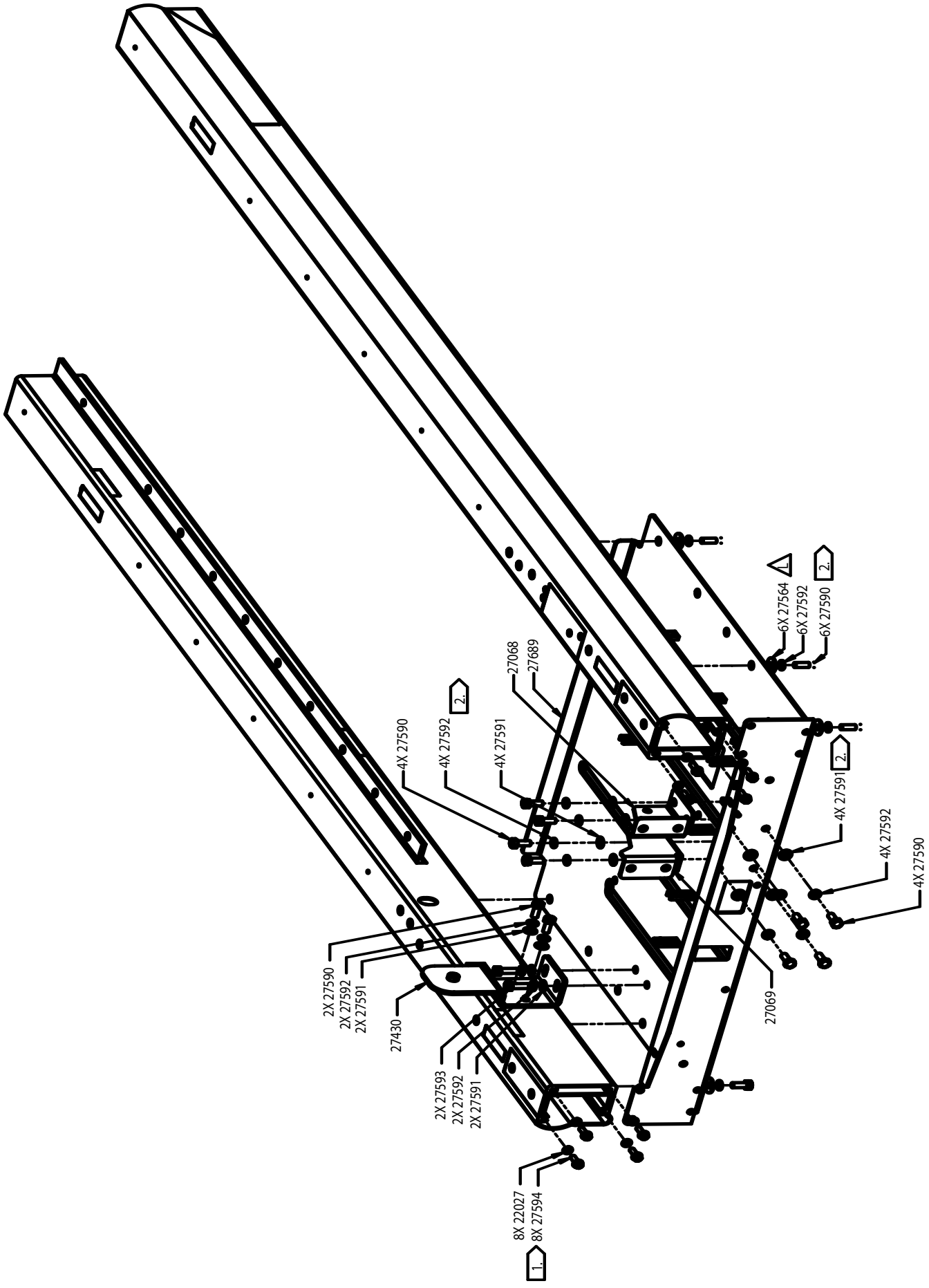
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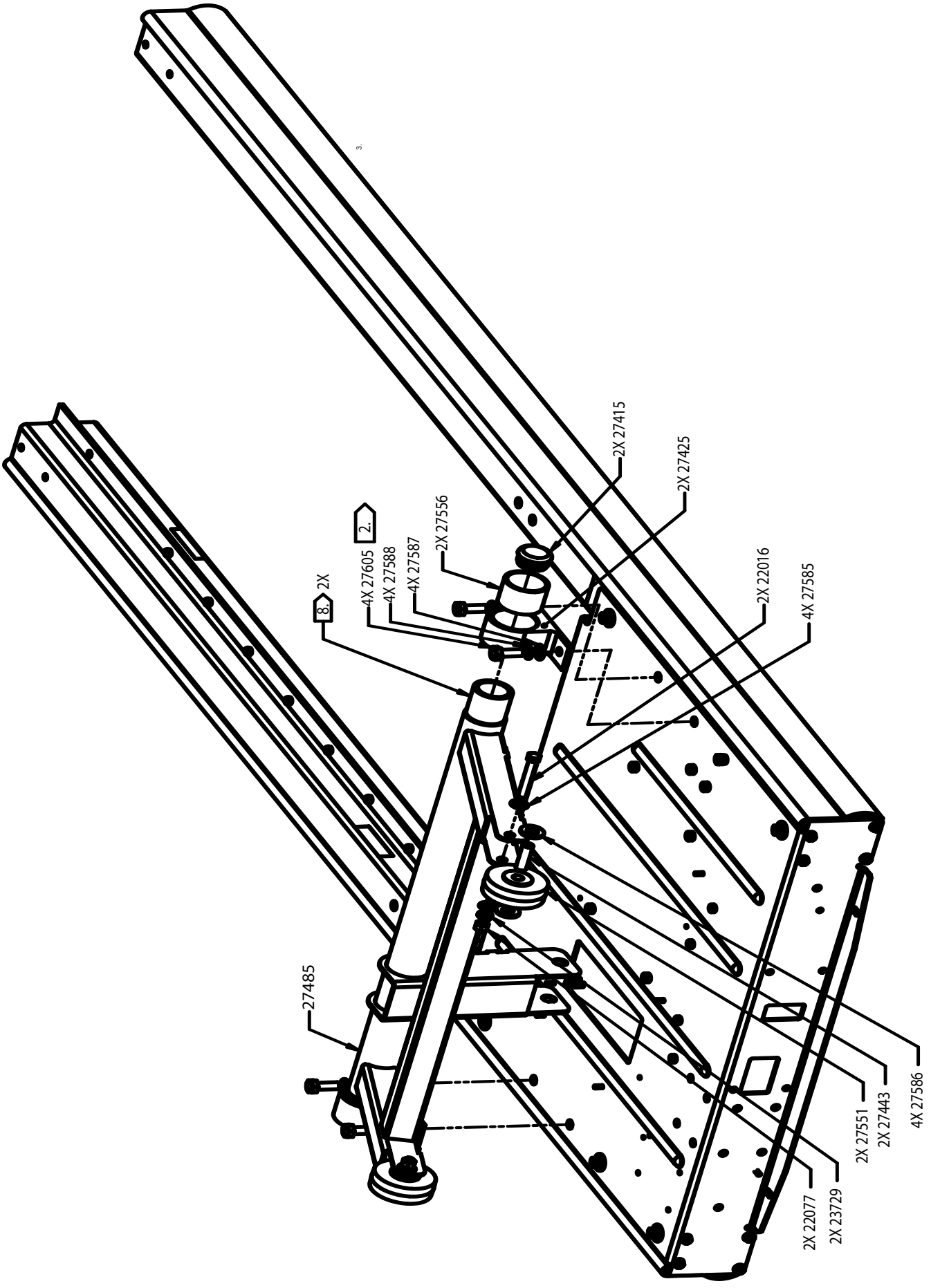
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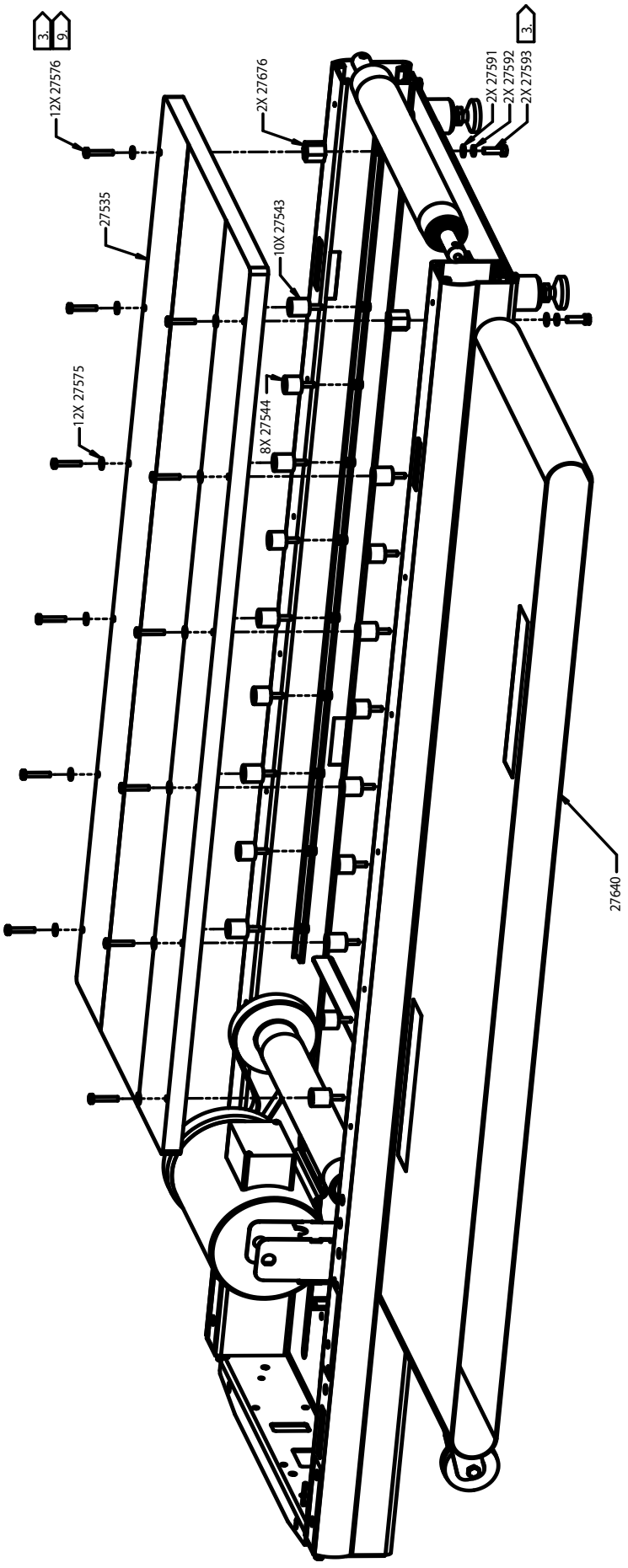
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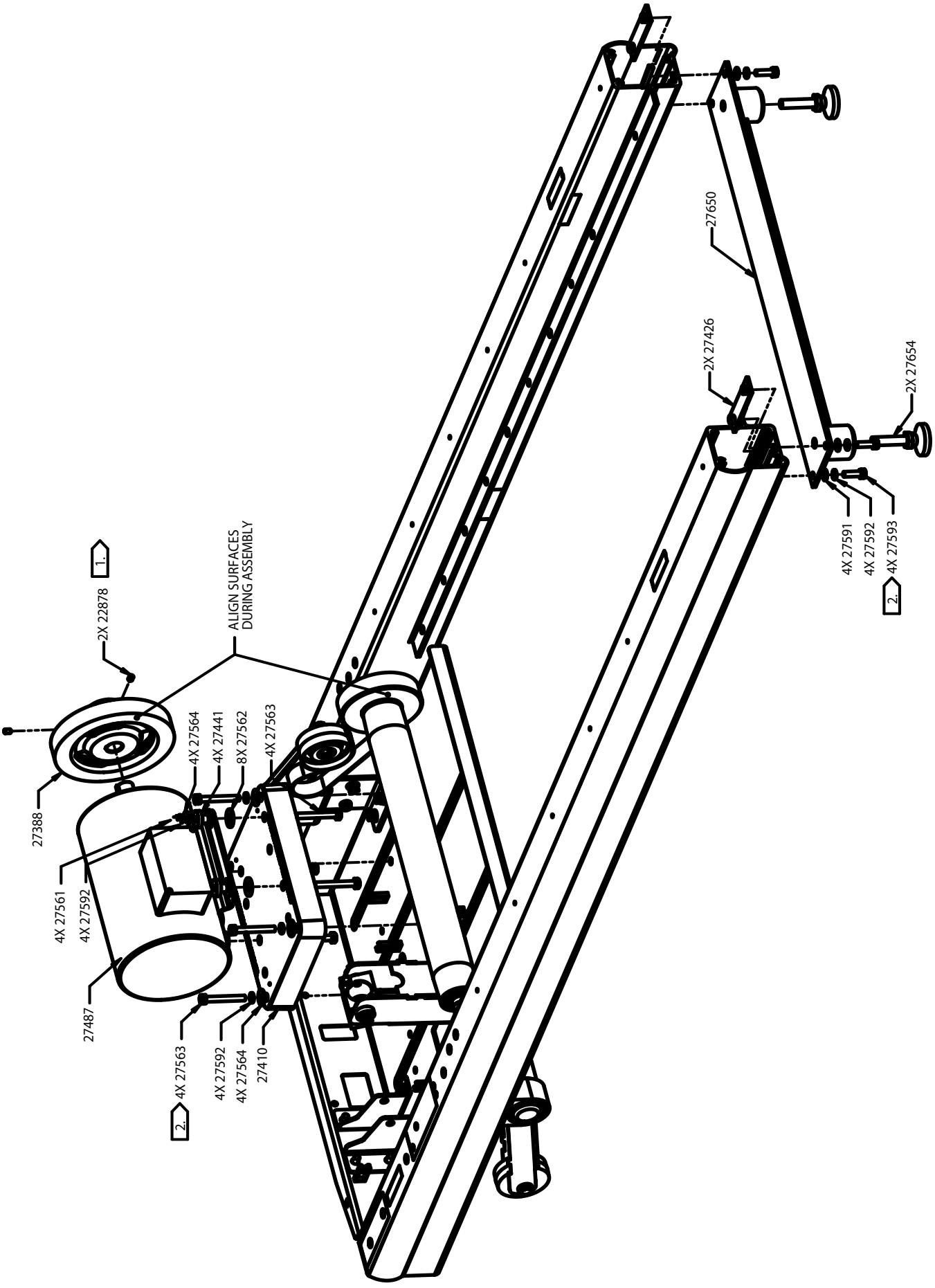
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ALIGN SURFACES
DURING ASSEMBLY
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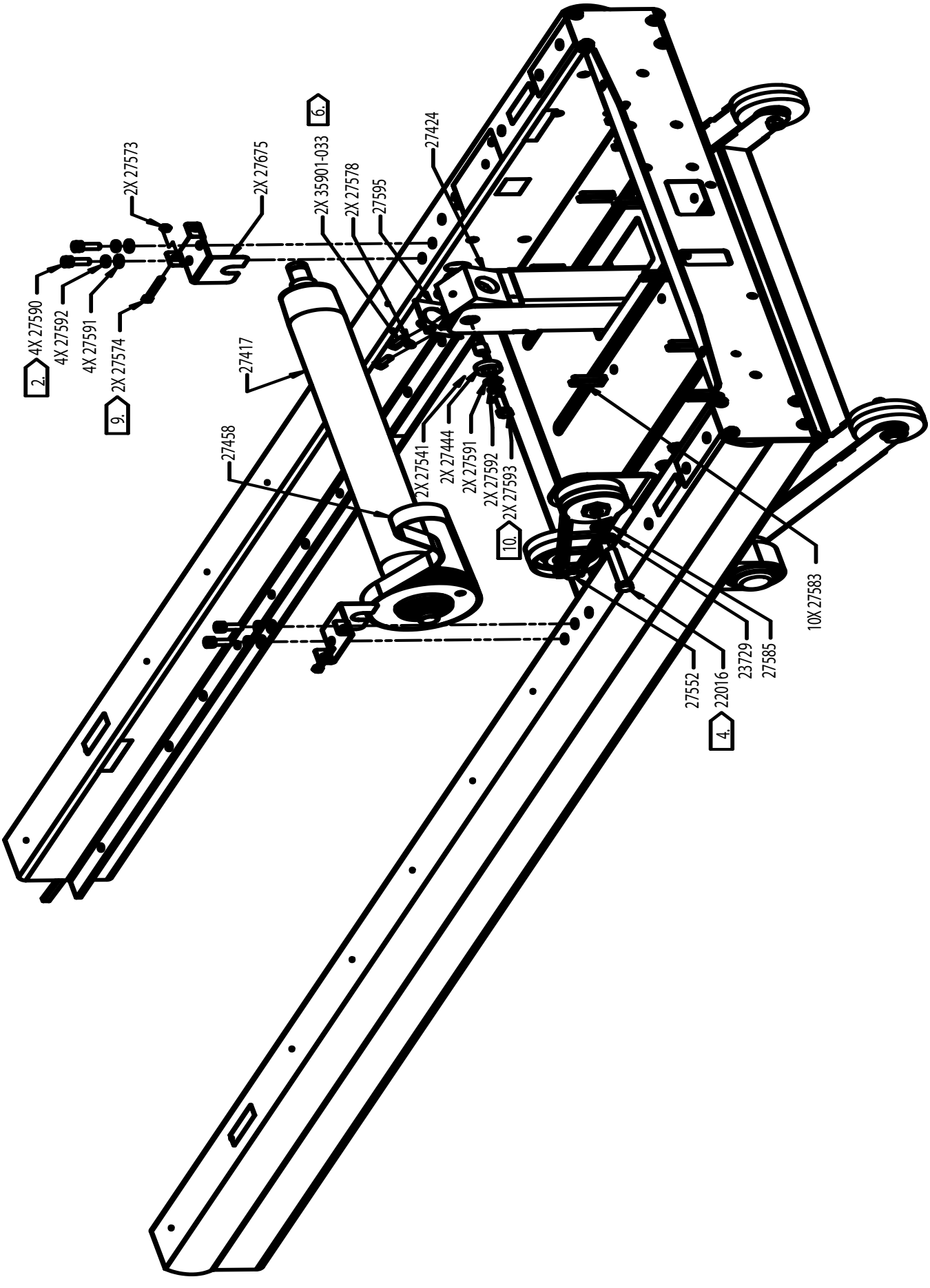
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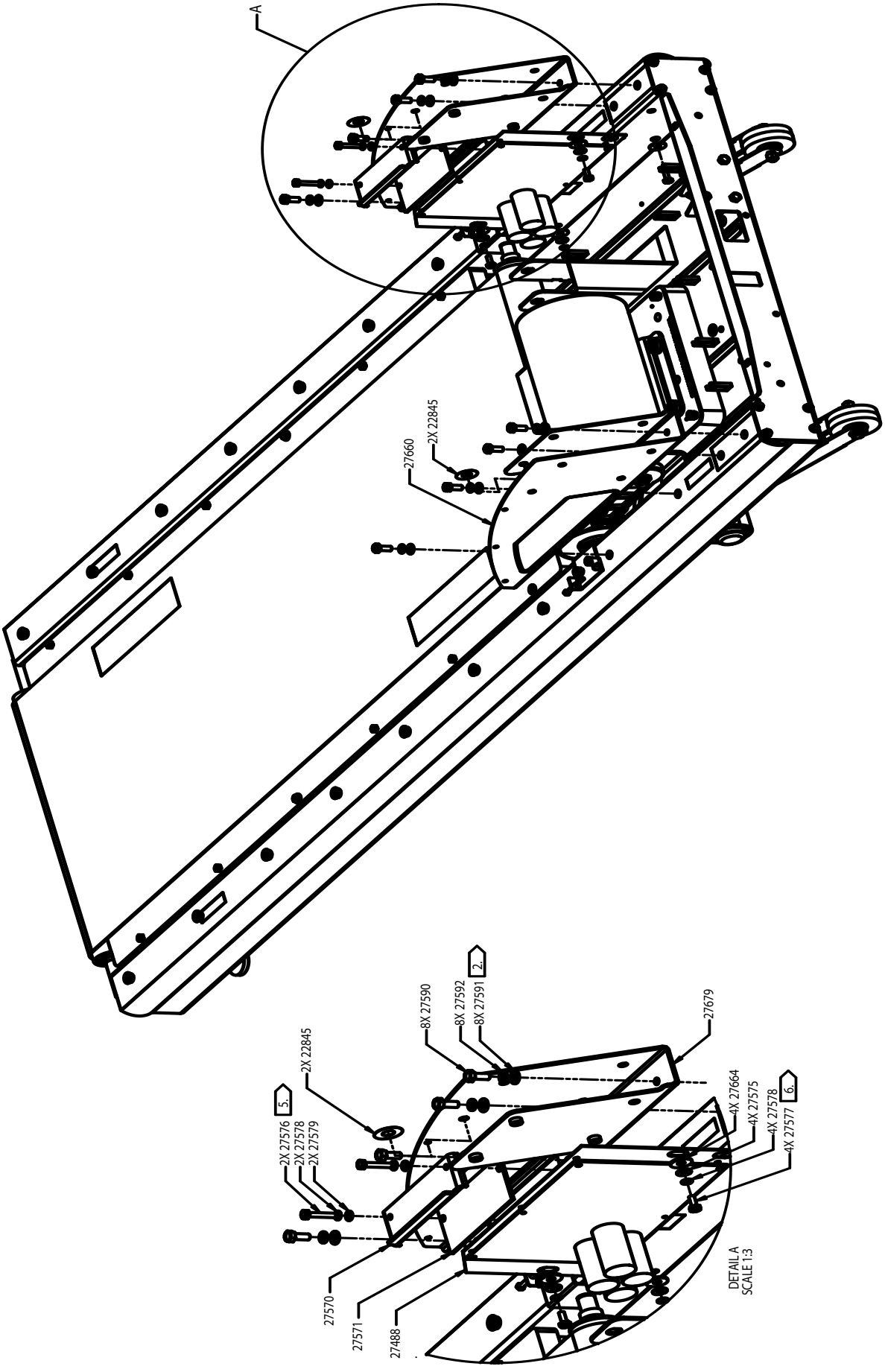
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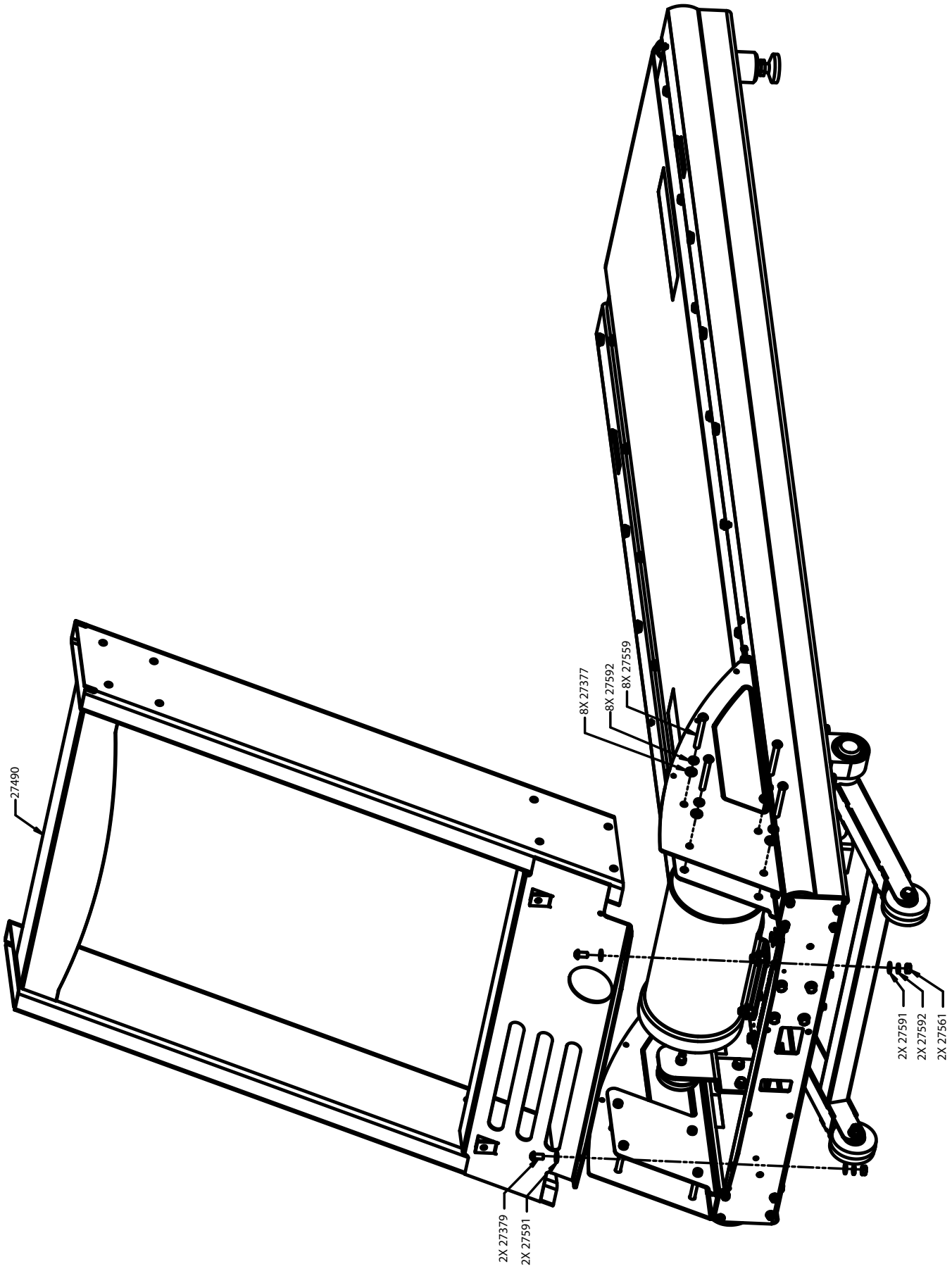
DETAIL A
SCALE 1:3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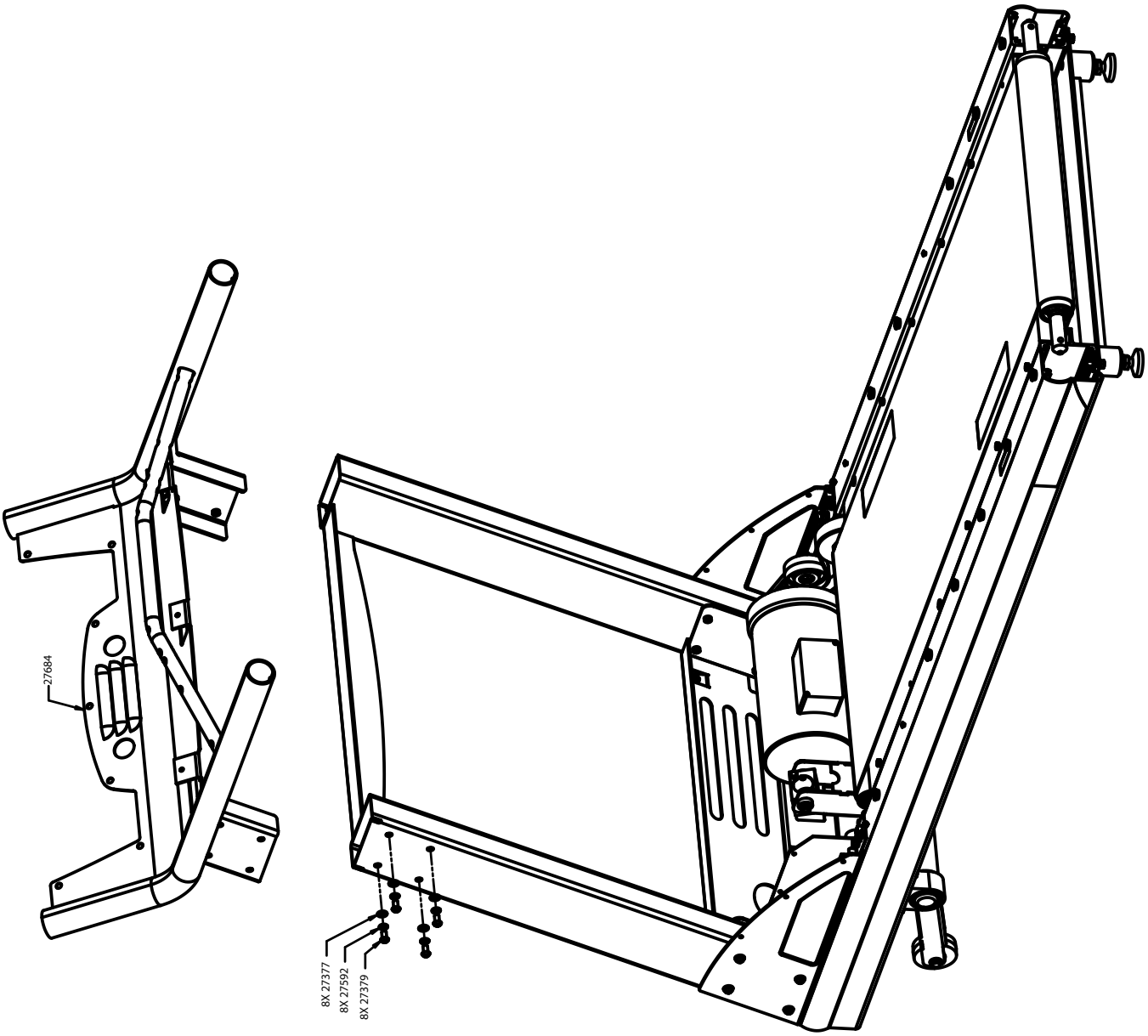
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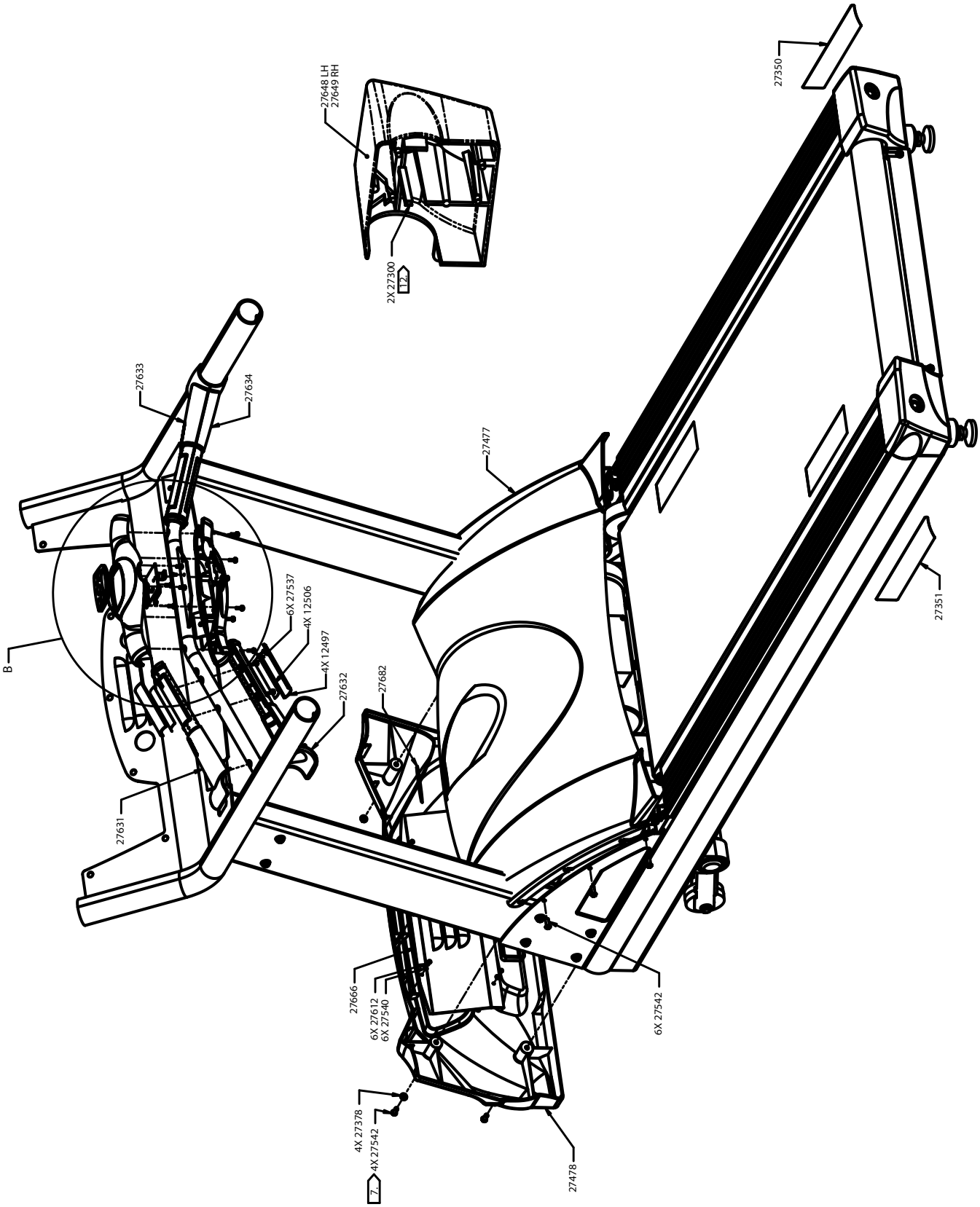
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27634
27477
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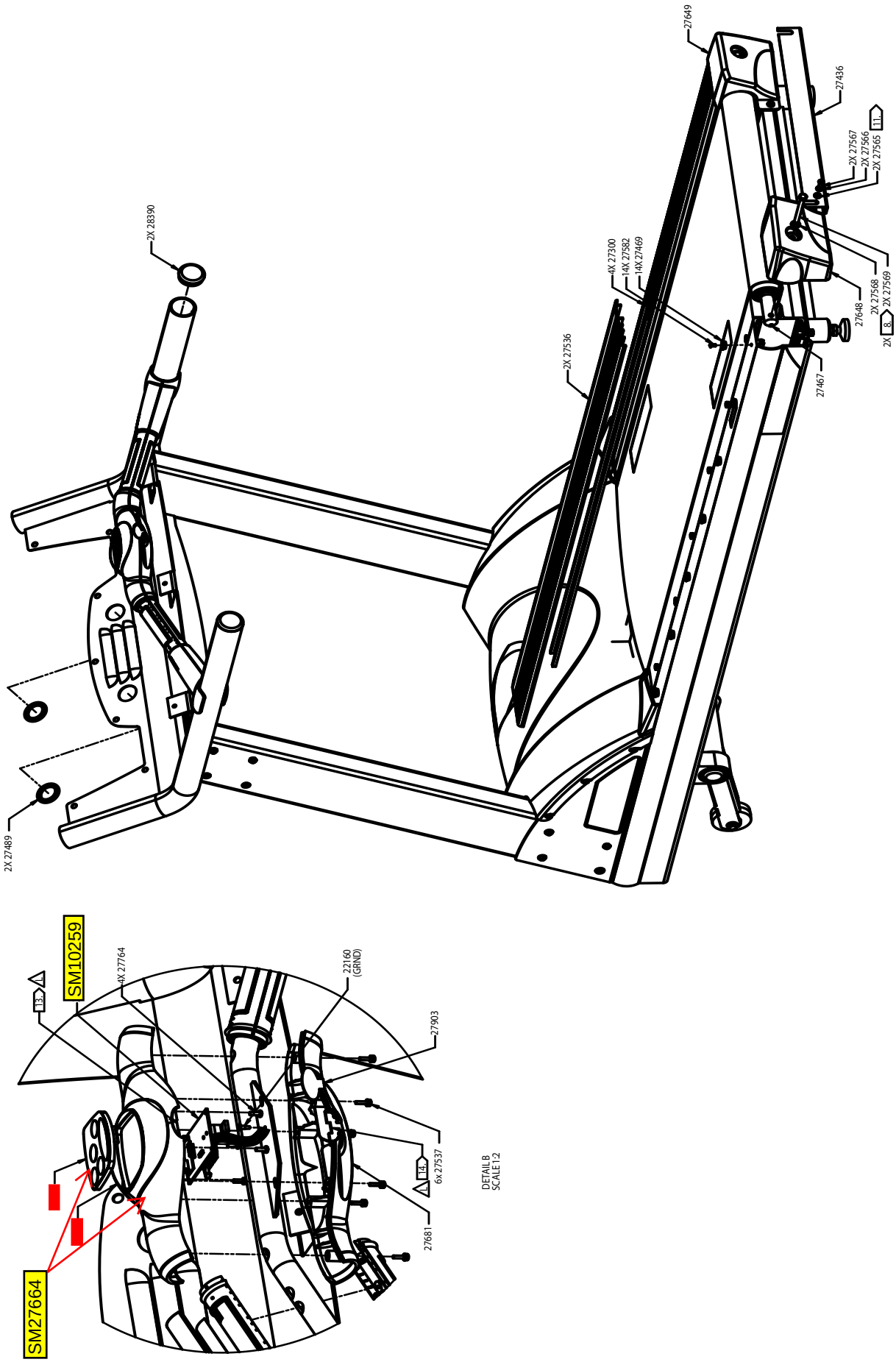
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8.
2X
27648
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27467
2X 27489
SM10259
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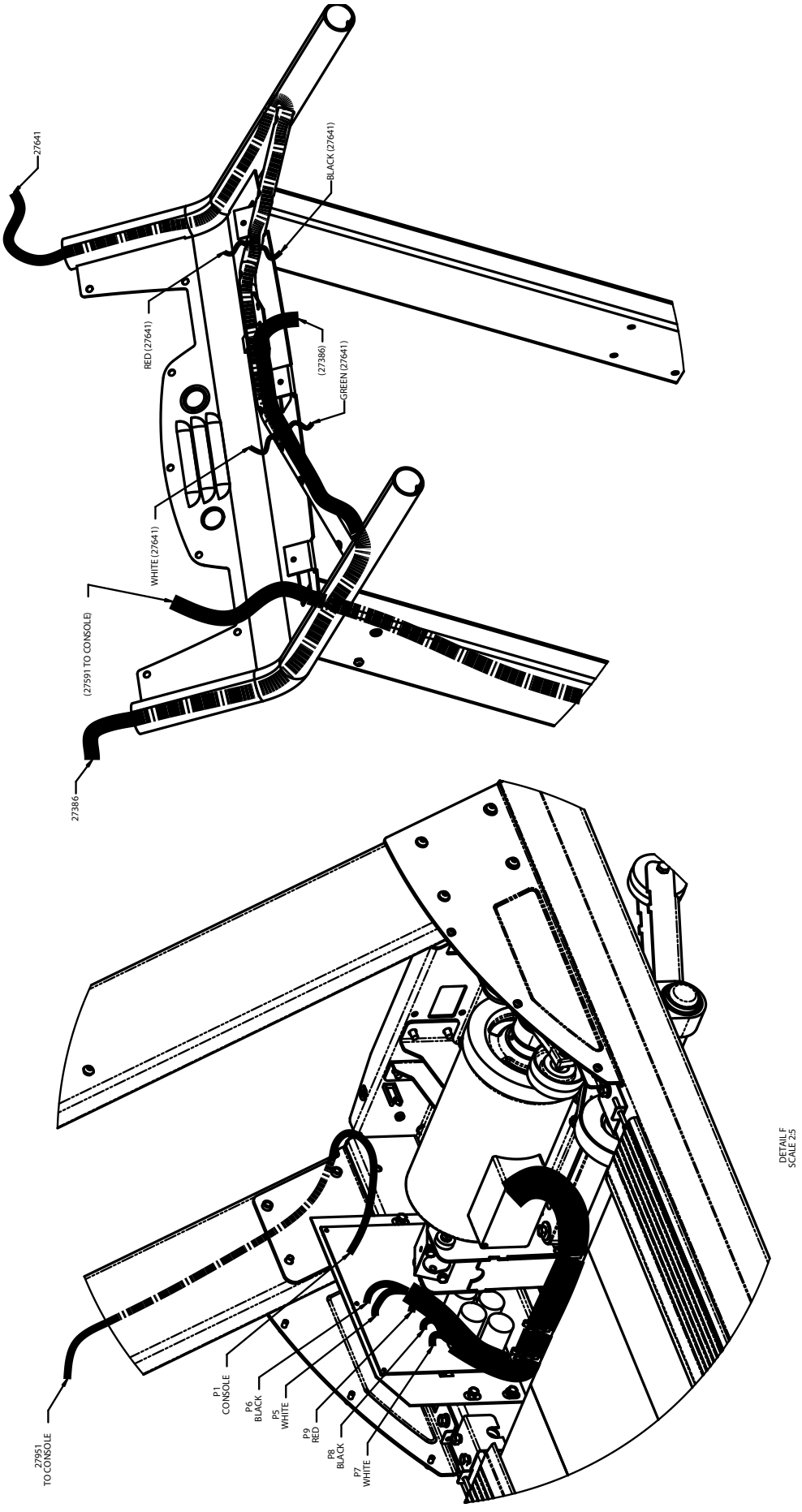
4X 27764
22160 (GRND)
27903
14.
6X 27537
27681
SM27664
DETAIL B
SCALE 1:2


27641
BLACK (27641)
RED (27641)
(27386)
GREEN (27641)
WHITE (27641)
(27591 TO CONSOLE)
27386
DETAIL F
SCALE 2:5
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TO CONSOLE
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CONSOLE
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P5
WHITE
P9
RED
P8
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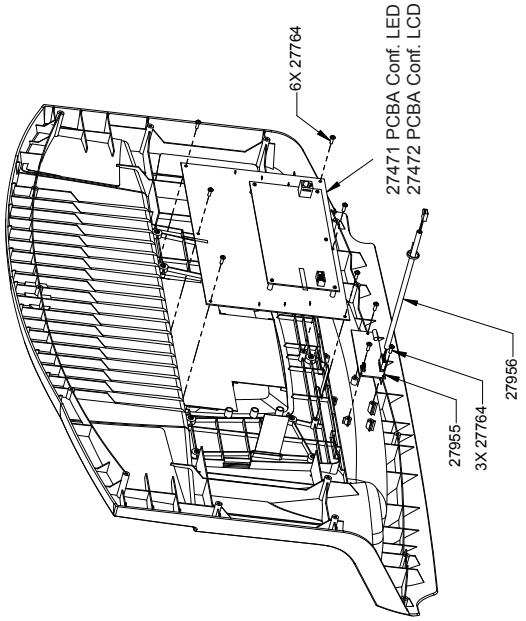
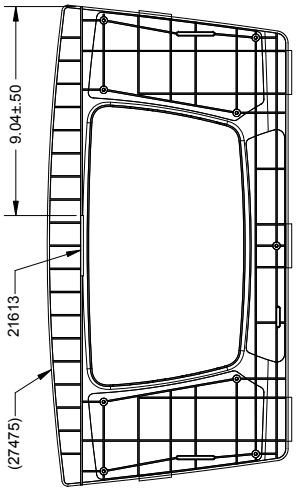
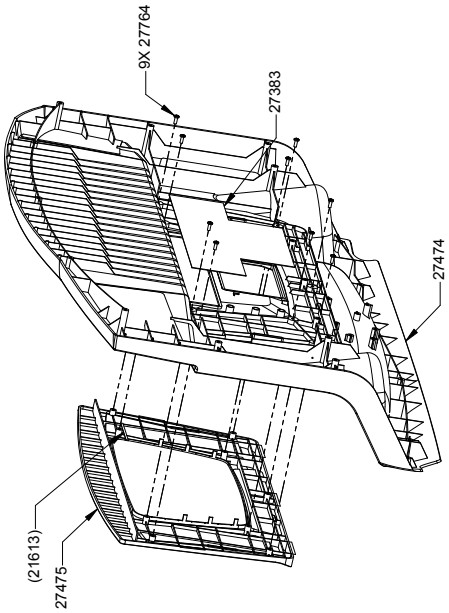
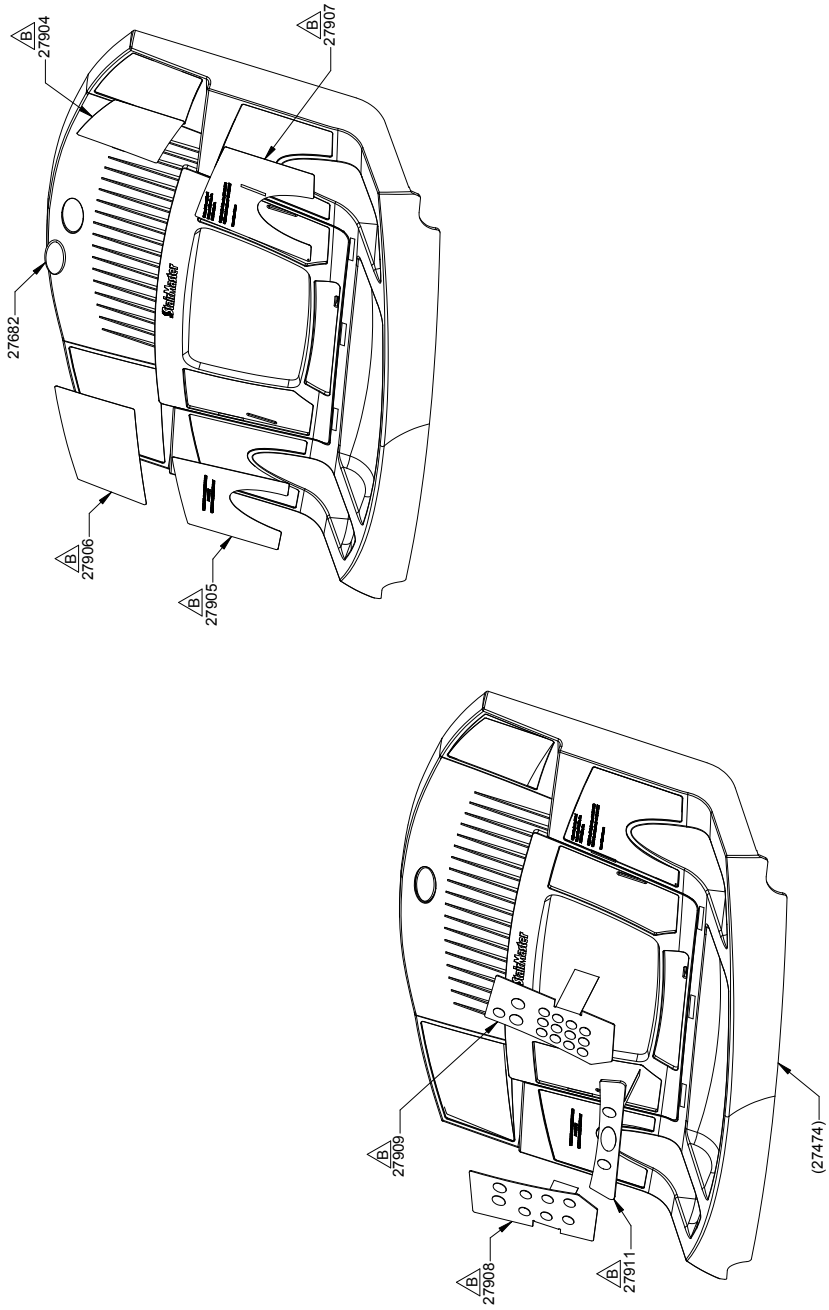
P7
WHITE

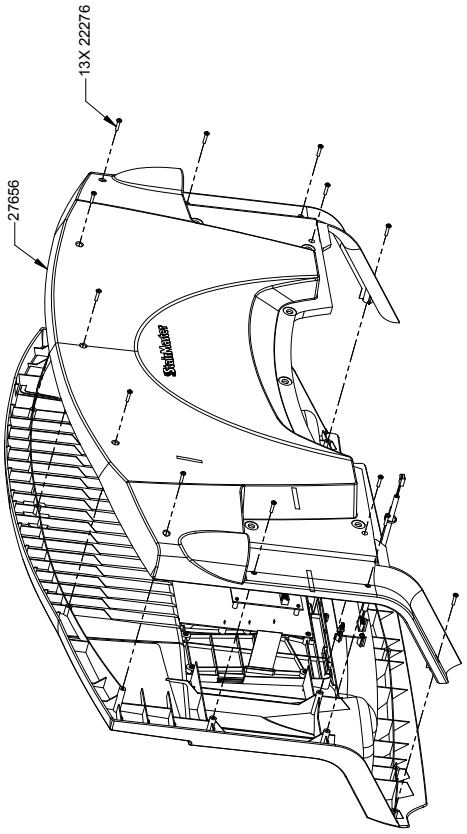


Detail A: Confirm the placement of 3 jumpers across PC0, PC3 and PC5 located in the upper right hand corner of the PCBA. These jumpers identify the correct grade and speed configuration for the product.






B 27904
B 27907
27682
B 27906
B 27905
B 27909
(27474)
B 27908
B 27911


13X 22276
27656

Part 6

Appendixes

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Appendix C—Replaceable Parts Lists....74
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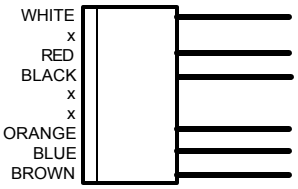
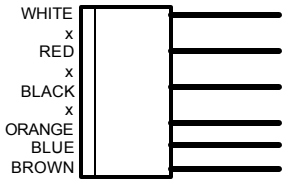
Required Tools

This is a list of the most common tools you will need to service the treadmill.

Table 6–1. Required Tools and Uses

Tool	Purposes
Socket wrench	General
13-mm socket	Removing and installing tracking bolts, front roller retainers, motor hardware, and grade block hardware
10-mm socket	Removing and installing deck screws, VSD mounts, configuration mounts, and grounding screws
9/16" socket	Removing and installing upper grade actuator mount; adjusting motor drive belt tension
9/16" open-end box wrench	Removing and installing upper grade actuator mount
3/4" wrench	Adjusting feet
15/16" open-end box wrench	Adjusting motor drive belt tension
5-mm Allen wrench	Removing and installing console and uprights
M-4 Allen wrench	Removing and installing hood screws
M-4 Allen wrench	Front cosmetic cover
T-10 Torx screwdriver	Ergo PCB
T-15 Torx screwdriver	Removing and installing three (3) screws underneath the console
#1 Philips screwdriver	Removing and installing Ergo and CHR housings
Tape Measure	Adjusting belt tension
Pliers	General
Diagonal cutters	General
Multimeter	Electrical troubleshooting
Vacuum	Cleaning the motor housing and side rails
#000 Steel Wool or Scotch-Brite™ pad	Cleaning the wax from front and rear rollers

Differences Between 2100 and 510/612 Motor Wiring

ClubTrack® 2100	ClubTrack® 510/612
Config Plate: • Transformer output is 12VAC. **Not** the same transformer as on 510/612. • Line filter is Corcom F7585B for all models. • Uses same circuit breaker as Club 510/612. • Uses same Config PCBA as Club 510/612.	**Config Plate:** • Transformer output is 20VAC. • Line filter is Corcom F7585B for 230V models, F7585A for 120V.
Grade Motor: • Black wire is moved one pin toward the red wire compared to 510/612. This was required to meet commercial safety standards. 	**Grade Motor:** 
Main Motor: • Leeson 230V 3-phase AC induction. • Has 3 wires for connecting to 3-phase power input. • Has 2 more wires that are thermal switch outputs. These are normally closed but will open if motor overheats.	**Main Motor:** • Baldor 200V 3-phase AC induction. • Has 3 wires for connecting to 3-phase power input.
Console: • C50 with LED or LCD display. • Commercial contact heart rate (CHR) system has higher performance than 510/612. • Separate Ergo Board contains telemetry heart rate and magnetic stop key inputs.	**Console:** • C40 LCD or Plus graphics LCD. • Isolated contact heart rate (CHR) system. • Telemetry heart rate and magnetic stop key are part of the main Console Board.
Cables (Drive Board): • Config cable: From Config PCBA to Drive Board (P20). Has new connector on Drive Board side–prevents “off by one pin” problems. • Main VBUS wires (heavy blue/brown wires from Config Plate to Drive Board): For 120V, individual wires plug into P11, P15 on Drive Board. For 230V, a single connector plugs into P19. • Communications cable to Console: Plugs into P1 on Drive Board using a single in-line latching header. Second half of cable plugs into corresponding Console connector. The two half-cables are mated together when the Console is first installed.	

Replaceable Parts Lists

Use the following parts list to order parts for the repair of the 2100 treadmills.

Warranty Terms: Please note that warranty terms may differ outside the U.S.A. Contact your local dealer or distributor in your country to receive the warranty terms for your area.

Code 1 - 3 Year standard coverage on parts.
Code 2 - 1 Year standard coverage on wearable parts.
Code 3 - 15 Year standard coverage on frame and motor.

Table 6–2. Documentation Part Numbers

Owners Manual	2100 LE	2100 LC
Portugese	SM27143	SM27143
Dutch	SM27144	SM27144
French	SM27145	SM27145
German	SM27146	SM27146
Italian	SM27147	SM27147
Spanish	SM27148	SM27148
English	SM27149	SM27149
User Guide	SM27483	SM27483

Table 6–3. Accessories

Part Number	Description	Notes
SM27328	ClubTrack 2100 Decline Opt Kit	Weldment Only
SM27331	ClubTrack 2100 Rail Ext Kit	
SM27332	ClubTrack 2100 Right Rail Kit	
SM27333	ClubTrack 2100 Left Rail Ext	

Table 6-4. Common Parts 110V, 220V and 240V Versions

Part Number	Level 1	Level 2	Level 3	Description	Warranty Code
SM20423	20423			Tyrap, 1/8 x 7.515	1
SM20473	20473			Tyrap, 1/8 x 4	1
SM21135	21135			Loom, Flexible .350 ID	1
SM22077	22077			Nut, 3/8-16 NC Finish Hex	1
SM24309	24309			Screw, .375-16 x 5.50, Hex Hd Cap	1
SM27122	27122			Assy., Harness, Jumper, Male QD	1
SM27353	27353			Decal, ClubTrack 2100-LC Left	2
SM27354	27354			Decal, ClubTrack 2100-LC Right	2

Table 6-4. Common Parts 110V, 220V and 240V Versions

Part Number	Level 1	Level 2	Level 3	Description	Warranty Code
SM27377	27377			Washer, M8, Flat Stainless	1
SM27379	27379			Screw, M8 x 1.25 x 20 BHC	1
SM27482	27482			Unpacking Instructions	n/a
SM27483	27483			User Guide, 2100 Treadmill	n/a
SM27591	27591			Washer, M8, Flat	1
SM27606	27606			Kit, Hardware, 2100	1
SM27325	27325			Assy., Controller, C50-LCD	n/a
SM27472		27472		PCBA, Display/Processor, C50-LCD	1
SM27474		S27474		Assy, Frt Controller Housing, 2100	1
SM27475		S27475		Assy., Display Lens	1
SM27627		S27627		Kit, C50, Key Panel, RH	1
SM27656		27656		Controller Housing, Bottom	1
SM27908		27908		C50 Keypanel, LH, English	2
SM27909		27909		C50, Keypanel, RH, English	2
SM27911		27911		C50, Keypanel, Mid, English	2
SM27955		27955		PCBA, Contact, HR, 2100 Treadmill	1
SM27470	27470			Assy., Controller, C50-LED	n/a
SM27471		27471		PCBA, Display/processor, C50-LED	1
SM27474		S27474		Assy., Front Controller Housing 2100	1
SM27475		S27475		Assy., Display Lens	1
SM27627		S27627		Kit, C50 Key Panel RH	1
SM27656		27656		Controller, Housing Bottom	1
SM27908		27908		C50 Keypanel LH English	2
SM27909		27909		C50 Keypanel RH English	2
SM27911		27911		C50 Keypanel Mid English	2
SM27955		27955		PCBA, Contact HR 2100 Treadmill	1
SM27671	27671			Mechanical, Assy.-2100 Treadmill	n/a
SM12497		12497		Contact with adhesive	2
SM22016		22016		Screw, .375-16 x 2.50 Hex Hd Cap	1
SM22027		22027		Washer, .250 Split Lock	1
SM22077		22077		Nut 3/8-16 NC Finish Hex	1
SM22160		22106		Screw, #6 x .38 Thread Form Phil	1
SM22845		22845		Washer, 1 1/4 x 17/32 x .010T	1

Table 6-4. Common Parts 110V, 220V and 240V Versions

Part Number	Level 1	Level 2	Level 3	Description	Warranty Code
SM22878		22878		Screw, Set, Socket, .250-28 x .38	1
SM23729		23729		Washer, 3/8 Split Lock	1
SM27000		27000		Fast Tab, .250	1
SM27068		27068		Assembly, Bracket, Actuator	1
SM27069		27069		Assembly, Bracket, Actuator	1
SM27300		27300		Felt, Adhesive-backed	1
SM27350		27350		Decal, Stairmaster Right, 2100	2
SM27351		27351		Decal, Stairmaster Left, 2100	2
SM27388		27388		Flywheel, Cast	1
SM27410		27410		Motor Mount, Molded	1
SM27415		27415		Plug, Hole, Rib-Lock	1
SM27417		27417		510/612 Front Roller Assy.,	1
SM27424		27424		Block, Grade Nut	1
SM27425		27425		Support, Grade Weldment Mach.	1
SM27426		27426		Assy., Nutplate Foot	1
SM27430		27430		Bracket Assembly, Tensioner	1
SM27436		27436		Guard Foot	3
SM27441		27441		Washer, Shoulder Isolation	1
SM27444		27444		Bushing, Shoulder	1
SMQ32387-001		~~27458~~		Poly-V Drive Belt, 280J10	1
SM27467		27467		Pulley Assy, Rear	1
SM27477		S27477		Assy., Hood, 2100	2
SM27478		S27478		Assy., Front Cover	2
SM27485		27485		Weldment, Grade	3
SM27487		27487		Drive Motor, AC Variable	3
SM27490		27490		Weldment, Upright	3
SM27535		27535		Bed, Slider 612/2100	2
SM27536		27536		Extrusion, Sidewall Cover	2
SM27537		27537		Screw, M3 x 0.50 x 12 Pan Head, Ext.	1
SM27540		27540		Washer, M3, Flat	1
SM27541		27541		Bushing, Bronze, 0.313 x .501 x .500	1
SM27542		27542		Screw, M6 x 1.0 x 16, Button Head	1
SM27552		27552		Rotary Tensioner	1

Table 6-4. Common Parts 110V, 220V and 240V Versions

Part Number	Level 1	Level 2	Level 3	Description	Warranty Code
SM27556		27556		Bushing, Grade Adjustment	1
SM27559		27559		Screw, M8 x 1.25 x 70, Button Hd	1
SM27561		27561		Nut, M8, Hex, Zinc Plated	1
SM27562		27562		Washer, Neoprene, .490 x 1.063 x .09	1
SM27563		27563		Screw, M8 x 1.25 x 70, Button Head	1
SM27564		27564		Washer, M8, Flat, Ender	1
SM27565		27565		Washer, M6, Flat, Black	1
SM27566		27566		Washer, M6, Split Lock Black	1
SM27567		27567		Screw, M6 x 1.00 x 16, Buttonhead Bl	1
SM27568		27568		Washer, M8, Flat, Black	1
SM27569		27569		Screw, M8 x 1.25 . 90, HHCap, Blk	1
SM27570		27570		Clamp, VSD Board	1
SM27571		27571		Pad, VSD Clamp	1
SM27573		27573		Nut, M5 Hex Zinc Plated	1
SM27574		27574		Screw, M5 x 0.80 x 50 HHC	1
SM27575		27575		Washer, M6, Flat Wide	1
SM27576		27576		Screw, M6 x 1.00 x 16 Buttonhead, Bl	1
SM27577		27577		Screw, M6 x 1.00 x 16 HHCap	1
SM27578		27578		Washer, M6, Split Lock, Zinc	1
SM27579		27579		Washer, M6, Flat Zinc	1
SM27583		27583		Guide Wire .500	1
SM27585		27585		Washer, .406 x .812 x .065 Flat	1
SM27586		27586		Spacer Nylon .125 x .500 x 1.120	1
SM27590		27590		Screw, M8 x 1.25 x 20 HHCap	1
SM27592		27592		Washer, M8, Split Lock	1
SM27593		27593		Screw, M8 x 1.25 x 25, HHCap	1
SM27594		27594		Screw, .250 - 20 x .75 HX Wash Hd	1
SM27631		27631		Assy., CHR/Ergo Bar Housing, LH	2
SM27632		27632		Assy., CHR/Ergo Bar Housing, RH	2
SM27640		27640		Belt, Walking, 130, Black	2
SM27646		S27646		Assy., Siderail, 2100, RH	1
SM27647		S27647		Assy., Siderail, 2100, LH	1

Table 6-4. Common Parts 110V, 220V and 240V Versions

Part Number	Level 1	Level 2	Level 3	Description	Warranty Code
SM27648-00		S27648-00		Assy., Endcap, Siderail, Left Gray	3
SM27649-00		S27649-00		Assy., Endcap, Siderrail, Right Gray	3
SM27654		27654		Pad, Leveling, Swivel 1/2” - 13	1
SM27660		S27660		SV Assy., Upright Support, RH, LED	3
SM27664		S27664		Assy., Ergo Bar Keypanel	2
SM27665		27665		PCBA, Ergo Bar	1
SM27675		27675		Assy., Retainer, Frt Roller Shaft	1
SM27676		27676		Spacer, Soft Deck	1
SM27677		27677		Assembly, Stiffner, Siderail, LH	3
SM27678		27678		Assembly, Stiffner, Siderail, RH	3
SM27679		S27679		SV Assy., Upright Support, LH, LED	3
SM27684		27684		Weldment, Controller Support	3
SM27689		27689		Assembly, Headframe, Steel	3
SM27764		27664		Screw, Selt Tapping, #6 x 3/8	1
SM27885		S27885		Spares, Tripleflex Hardware, 2100	1
SM27888		S27888		Kit, Rear Suport, 2100	3
SM27892		S27982		Kit, Transport Wheel Hardware, 210	2
SM27893		S27893		Kit, Grade Weldment, Hdware 2100	1
SM27897		S27897		SV Assy., Upright Support LH LCD	3
SM27898		S27898		SV Assy., Upright Support RH LCD	3
SM27951		27951		Assy., Cable, Lower C50 TM Com	1
SM27952		27952		Assy., Cable, Upper C50 TM Com	1
SM33511-002		33511-002		Kit, Tripleflex, 510/612	1
SM36125-001		36125-001		Grade Wheel Spares Kit	2
SM40012-001		40012-001		Magnetic Switch Assembly	2
SM27488		27488		Assy., VSD	1
SM41387			41387	Assembly, PCB, AC Drive 3	1

Table 6-5. 110V Parts Only

Part Number	Level 1	Level 2	Level 3	Description	Warranty Code
SM27384	27384			Assy., Config Plate, 2100, 110V	1
SM27317		27317		Filter, Noise RFI	1
SM27319		27319		Circuit Breaker, ME	1
SM27320		27320		Treadm Powcrd ST55/65 2100	1
SM27962		27962		Assy., Transformer, 2100 Treadmill	1
SM35774-002		35774-002		PCBA, Config Plate 510/612	1
SM27378		27378		Washer, M6, Flat, Stainless	1
SM27386		27386		Assy., Cable, C50 Ergobar	1
SM27966		27966		Actuator, Linear, 110V, 2100 TM	1

Table 6-6. 220V Parts Only

Part Number	Level 1	Level 2	Level 3	Description	Warranty Code
SM27385	27385			Assy., Config Plate, 2100, 240V	1
SM27317		27317		Filter, Noise RFI	1
SM27308		27308		Circuit Breaker, ME	1
SM27962		27962		Assy., Transformer, 2100 Treadmill	1
SM36498-002		36498-002		PCBA, TM Volt Config 230V	1

Table 6-7. 240V Parts Only

Part Number	Level 1	Level 2	Level 3	Description	Warranty Code
SM27125	27125			Choke Assembly, 2100 Euro TM	1
SM27573	27573			Nut, M5, Hex, Zinc Plated	1
SM27140	27140			Assy., Config Plate, 2100, 220V	1
SM27317		27317		Filter, Noise RFI	1
SM27308		27308		Circuit Breaker, ME	1
SM27127		27127		Assy., Transformer, 2100 Treadmill	1
SM36498-002		36498-002		PCBA, TM Volt Config 230V	1

Using a Multimeter

How to Use a Multimeter

This is a basic overview of multimeters. For in depth directions, please use the manual provided with your multimeter.

Whats Does a Multimeter Do?

A multimeter combines the functions of three instruments: ammeter (measures current), voltmeter (measures voltage), and ohmmeter (measures resistance).
Electronic signals are usually thought of in terms of voltage. For that reason, and because it is an easier measurement to take, we will use the volts setting. We will not want to use the ammeter setting to troubleshoot fitness equipment.
The ohmmeter setting is used to determine whether there is an open circuit (a bad connection or break in the wires) or a short circuit (two wires that normally would not come in contact with each other have been pinched together or crossed in some way).
Ohmmeters work by passing a small current through the wire or component and measuring the voltage produced.

Type of Multimeters

Multimeters are available in digital and analog models. Digital meters give an output in numbers usually on a LCD. Analog meters move a needle along a scale.
We recommend using a digital meter. While analog meters can be very cheap, they are difficult for beginner to read accurately, especially on resistance scales. Also, the components are delicate and easily damaged.

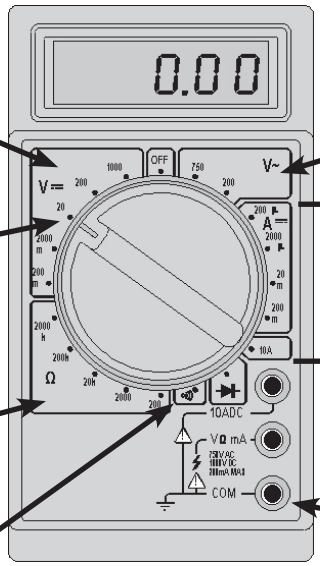
Settings

For the beginner the multimeter can be intimidating because of the range of settings available. The diagrams on page 75 show what settings to use when checking voltage and resistance on the fitness equipment. Perhaps more importantly, it shows which settings are not needed.
There are two types of digital multimeters commonly available:

- switched range and
- autoranging.

Switched range meters require you to choose the appropriate position from the many choices available on the dial. For example, if the dial is switched to 20VDC, 20 volts is the maximum voltage that can be measured. This is important when you want to read small increments in voltage accurately. For example, if the required voltage is 13.5 volts and the meter is set too high, you may only see 13 volts on the readout. Setting the meter to a lower maximum will show 13.5 volts.
Autoranging meters automatically adjust the range to give an accurate reading. This type of meter is more expensive but much easier to use.

Switched Range Meter



Set here to check DC voltage

20 will be the most used setting for measuring DC voltage output

Set here to check resistance (ohms)

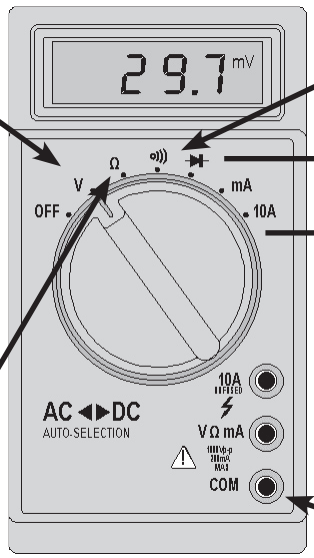
Or here to listen for an audible response (useful when testing a sensor)

Set here to check AC voltage

These are for checking amps and are not needed for our purposes

Black (negative) lead always goes here

Autoranging Meter



Set here to check AC or DC voltage

Set here for an audible response

The remaining three are for amps settings

Set here to check resistance (ohms)

Black (negative) lead always goes here

Checking Resistance

Use this procedure to check for broken wires:

1. Set the multimeter to the lowest OHMs (resistance) range.
2. Attach the test leads on both ends of the wire being tested.
3. Observe the reading.

- A *short* circuit will read less than approximately 3 ohms. This is the correct reading for an undamaged wire.
- An *open* circuit will usually read infinite; on a digital meter it will have an error code. This signals a broken or cut wire.

Use this procedure to test for crossed wires. In most circumstances all indivudual wires in a cable will be insulated from each other. When a wire is pinched, it becomes short circuited to an adjacent wire. This can cause problems resulting in blown fuses or *fried* components.

1. Set the multimeter to the lowest OHMs (resistance) range.
2. Attach one test lead of the multimeter to one wire and check all adjacent wires. This can all be done at one end of the cable. However, the other end of the cable must be disconnected from the circuit board. All wires should be insulated from each other and therefore test open.
3. Observe the reading.

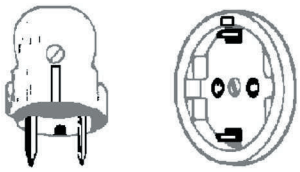
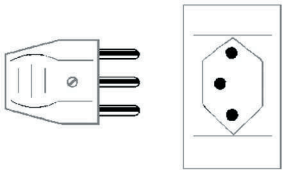
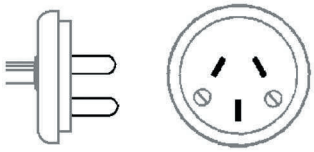
Checking Voltage

Use this procedure to check voltage output:

1. Determine whether the voltage is AC or DC voltage, and choose the appropriate setting on the multimeter.
2. Set the multitmeter to the lowest setting that is still higher than the highest output of the component being tested.
3. Place the black and red leads or probes on the appropriate corresponding wires, pins, or connectors.
4. Observe the reading, and proceed according to the troubleshooting sections in this manual.

International Power Plug Configurations

Table 6–11. International Power Plugs

Power Cords	System	Country	Part Number
	G	UK	SMQ30736-037
	C, E, F	Europe	SMQ30736-039
	J	Swiss	SMQ300736-027
	K	Australia	SMQ30736-041

Specifications

Electrical	Voltage	115VAC (220VAC)*
	Amperage	20A (10A)*
	Motor	4.8 hp, 230VAC, 60 Hz, 3 Phase
	Display	Back-lit LCD (2100LC), dot matrix (2100LE)
Physical	Length	88 in. (224 cm)
	Width	35 in. (89 cm)
	Height	59 in. (150 cm)
	Weight	400 lbs. (181 kg)
	Max User Weight Supported	400 lbs. (181 kg)
	Belt	20 in. X 60 in. (51 cm X 152 cm)
	Belt/Deck Lubrication	Proprietary low-friction polymer that requires no waxing or lubrication
	Belt Tracking Method	Crowned front and rear rollers center the belt automatically
Functionality	Speed Range	0.5 to 12 mph (.8 kph to 19.3 kph)
	Elevation Range	0 to 15% (Option: -3 to 12%)
	Number of Functions	Ten: Heart rate, elapsed time, calories burned, caloreis burned per hour, watts, METS, resistance level, rpm, distance, and workout profile
	Heart Rate Monitoring	Polar-compatible wireless and contact heart rate
	Workout Programs	Fourteen: Quick Start, Manual, Fat Burner, Calorie Burner, Speed Intervals, HR Zone Trainer, 5K Run, 10K Boulder Run, 9 Hole Walk, Custom Speed Intervals, HR Interval, Custom Calorie, Fit Test, and Firefighter Fit Test
	Language Options	English, German, Spanish, French, Italian, Dutch, Swedish, and Japanese
Environmental	Operating Temperature	50–90 °F (10–32 °C)
	Storage Temperature	-13–122 °F (-25–50 °C)
	Operating Humidity (non-condensing)	3–95% relative (Limited to 90 °F maximum dew point)
	Storage Humidity (non-condensing)	3–95% relative (Limited to 90 °F maximum dew point)
	Atmospheric Pressure (Operating)	8.60–15.0 psia, 445–775 mm Hg absolute
	Atmospheric Pressure (Shipping and Storage)	8.22–15.0 psia, 425–775 mm Hg absolute

* Domestic/international 220VAC model

If you need assistance, please have both the serial number of your machine and the date of purchase available when you contact the appropriate Nautilus office listed below.

OFFICES IN THE UNITED STATES:

- TECHNICAL/CUSTOMER SERVICE
  Nautilus, Inc.
  World Headquarters
  16400 SE Nautilus Drive
  Vancouver, Washington, USA 98683
  Phone: 800-NAUTILUS (800-628-8458)
  Email: customerservice@nautilus.com
  Fax: 800-523-1049

- MANUFACTURING FACILITY
  Nautilus, Inc.
  10757 East Ute
  Tulsa, Oklahoma, USA 74116

- CORPORATE HEADQUARTERS
  Nautilus, Inc.
  World Headquarters
  16400 SE Nautilus Drive
  Vancouver, Washington, USA 98683
  Phone: 800-NAUTILUS (800-628-8458)

For technical assistance and a list of distributors in your area, please call or fax one of the following numbers.

INTERNATIONAL CUSTOMER SERVICE:

- INTERNATIONAL OFFICE
  Nautilus International S.A.
  Rue Jean Prouvé 6
  1762 Givisiez / Switzerland
  Tel: + 41-26-460-77-77
  Fax: + 41-26-460-77-70
  Email: technics@nautilus.com

INTERNATIONAL OFFICES:

- SWITZERLAND OFFICE
  Nautilus Switzerland S.A.
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- GERMANY and AUSTRIA OFFICE
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